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Work Study on British Railways

THE announcement that a sub-committee comprising representatives of the British Transport Commission and of the railway and shipping unions will "clarify any factors which militate against full acceptance by staff of work study schemes" appears to show a change in the traditional union attitude toward examination of methods of working. This is a development welcome not only in itself, but as an indication of the current good relations which exist between management and men in British nationalised transport. Two factors undoubtedly have contributed toward the creation of these good relations: one of these is the effect on railwaymen of the praise given by impartial bodies such as the Guillebaud Committee to the Commission's attitude to its employees. The praise may well have fostered an already growing trust among railway employees in the good intentions of their employers. The second factor is the sincere desire of the working railwayman to improve both the letter and the spirit

of his performance so that modernisation can be carried out to the best possible effect. Nevertheless, it must also be true that a third factor is playing its part: the knowledge that increased pay can result from the application of work study. Illustrations of this are to be found in the Western and North Eastern Regions: in the first, track-laying performed in seven out of ten districts under a payment-by-results scheme adopted after work study had been applied means an extra £2 a week for each man concerned while, in the North Eastern Region, time-and-motion study methods are bringing in from £1 to £2 a week more for platelayers in the York, Doncaster, Sheffield, Darlington, and Newcastle areas. The Commission's representatives on the sub-committee will be Mr. A. R. Dunbar, Manpower Adviser; Mr. C. S. MacLeod, Director of Industrial Relations, and Mr. E. J. Larkin, Director of Work Study. There will be two representatives of the railway Regions, and either the President or General Secretary concerned will represent each of the three railway unions—the National Union of Railwaymen will contribute one extra representative—and the Confederation of Shipbuilding & Engineering Unions. Among subjects proposed for discussion are the acceptance of efficiency methods in marshalling yards, goods depots, and passenger stations. Broad principles will be discussed: individual cases will not be considered.

C.N.R. Headquarters Re-organisation

THE re-organisation of senior executive duties at the system headquarters of Canadian National Railways, which takes effect on September 1, is part of a general modification of the administration of the undertaking resulting from an appraisal of current requirements. It is understood that further alterations will be announced in the near future. The re-arrangement which comes into operation at the beginning of next month will affect all the activities relating to the marketing and operation of services. The changes will bring these functions under the direct control of the Executive Vice-President, Mr. N. J. MacMillan. His responsibilities will include jurisdiction over the Regional Vice-Presidents, the Vice-President and the General Manager of the Grand Trunk Western Railroad, and the General Manager of the Central Vermont Railway Inc., both of which are C.N.R. subsidiaries, the Vice-President of Sales, the Vice-President of Transportation & Maintenance, and the General Manager of Express. Reference is made in our personal columns to the appointments occasioned by the re-organisation.

Western Railway of India Expansion

FAR-REACHING plans have been made by the Western Railway of India for implementation by the end of the second Five-Year Plan, on March 31, 1961. In 1951-52 the total tonnage moved was 8,700,000, but five years later 11,400,000 tons were carried. In nine months' time, however, the capacity of this railway should be 17,000,000 tons, practically double what was carried 10 years earlier. Similarly, 286,000,000 passengers were carried in 1951-52, 305,000,000 at the end of the first Plan, and 400,000,000 are expected this year. To achieve these results some of the works undertaken are: (1) the already-completed constructions of 49 miles of new 5 ft. 6 in. gauge line and 74 miles of metre gauge during the Second Plan; (2) the doubling of 146 miles of track; (3) the provision of no fewer than 58 new crossing stations and of additional loop-lines at 110 stations; and (4) the increase in the capacity of workshops. In addition to the new sections of line just mentioned a further 144 miles of broad- and 133 miles of metre-gauge lines are already under construction. The doubling referred to is now nearing completion. With regard to expansion of workshop capacity a sum of nearly £3,500,000 is being spent to enable it to reach 620 locomotive- 5,110 coach-, and 11,725 wagon-repairs annually. Further, large sums are being allotted to repair facilities at running sheds, junctions and other out-stations.

Re-equipping the Yugoslav State Railways

NEARLY 60 diesel-electric and 10 electric locomotives, over 200 bogie passenger vehicles, and some 2,000 wagons, including 300 refrigerator wagons, are among the motive power and rolling stock to be acquired by the Yugoslav State

Railways. No steam locomotives are envisaged. The amount to be spent on locomotives and rolling stock during the current year, dinars 24,500 million, is 11 per cent more than last year. A loan of U.S.A. \$14,800,000 has been made from the Development Loan Fund for acquisition of motive power. Both Yugoslav and foreign industry is to manufacture this and other material required. Under the five-year plan for increasing the capacity of the State Railways, to keep pace with the expansion of the national economy, dinars 96,000 million is to be spent on new equipment, including locomotives. No specific mention is made in this connection of schemes for new electrification. The 10 electric locomotives mentioned above appear to be for the electrified lines taken over from the Italian State Railways when the frontier was adjusted after the last war and for new conversion in Slovenia.

Education for Industry

THE increasing complexity of work on railways, as in industry generally, demands qualities which are enhanced by a sound education. The British Employers' Confederation agrees with the broad aims set out in the report of the Central Advisory Council for Education (England), under the chairmanship of Sir Geoffrey Crowther. The Confederation has submitted its views to the Minister of Education. It considers that the advantage to industry of better-educated recruits resulting from an additional year of full-time education would outweigh any disadvantages, and supports in principle raising the school leaving age to 16. It agrees with the Minister that the extra year's full-time education for some young people might be best spent in a technical college. This accords with the extension of education to the age of 18 envisaged in the Education Act of 1944. The Confederation suggests that determination of priority between raising the school leaving age and establishing "county colleges" be left to local education authorities. It sees no reason for yet another category of establishment for further education and suggests that county colleges be regarded as places of further education in the broadest sense. Whatever shape further education takes, the many kinds of apprenticeship offered by British Railways and manufacturers of railway material must be co-ordinated with the new system.

Joint British Committee for Stress Analysis

INTERNATIONAL collaboration in the field of stress analysis is already catered for by periodic meetings of a permanent committee, membership of which is open to all West European countries. The constant need for weight reduction in rolling stock and the increasing use of light alloys adds particular significance and value to the recent formation of the Joint British Committee for Stress Analysis. This will represent the interests of Britain at meetings held in Europe of the permanent committee and to ensure participation in international conferences on the subject. Representatives are appointed by the Royal Aeronautical Society, the Institution of Civil Engineers, the Institution of Electrical Engineers, the Institution of Marine Engineers, the Institution of Mechanical Engineers, the Royal Institution of Naval Architects, the Institute of Physics, the Physical Society, the Institution of Structural Engineers, and the Institute of Welding. The collective interests of the constituent bodies will be further taken care of by maintaining liaison with overseas societies and institutions concerned with stress analysis. Mr. A. F. C. Brown of the National Physical Laboratory, who is representative of the Institution of Mechanical Engineers, has been elected the first chairman of the joint committee.

Wagon with 260-Ton Payload

ALTERNATORS and transformers for power stations are the principal loads for which Bonehill et Cie., of Raismes, is building a wagon with a 260-ton payload to run on the French National Railways. The wagon will be the property of the S.N.C.F. subsidiary, Les Transports Industriels, which provides special facilities for movement of large and heavy consignments. The tare weight is stated to be 140 tons, and the total number of axles 20. The largest loads will be borne on a framework in such a way that the load itself forms the frame connecting the two parts of the wagon, and so is in line with

modern practice. Other loads, it is stated, can be placed on a through girder, instead of actually forming a framework; and because of the weight of the girder the payload is reduced to 230 tons. Traffic in heavy electrical and other equipment is growing as a result of rapid industrialisation in France.

Better Local Services in Lancashire

INAUGURATION last month of the "Midland Pullman" diesel train between St. Pancras and Leicester and Manchester and the forthcoming placing in service of multiple-unit diesel Pullman trains between Paddington and Bristol and Birmingham has focused attention on long-distance luxury travel. A good deal has been heard also of the revolutionary improvements in local and branch services made possible by introduction of railcars, more particularly four or five years ago, when diesel railcars began to be delivered in considerable numbers. The public may not realise how great have been the recent improvements over extensive areas. In the London Midland Region, for instance, in industrial Lancashire, the Sunday service has been improved between Manchester and Blackburn, an inter-urban route which might not seem to offer great traffic possibilities on Sundays; there is now a two-hourly interval service of diesel trains throughout the day, providing a total of 16 through trains, compared with four last year. The Manchester to Burnley and Nelson service is being improved, as new diesel units become available. Early next year the number of weekday trains will be increased by 50 per cent, with a reduction in overall journey time (Manchester-Colne) from 76-110 min. to 75-85 min.

Western Region Diesel Pullman Trains

SIMILARITIES in the pattern of rostered workings to those now being operated by the London Midland diesel Pullmans are noticeable in the duties which the Western Region, British Railways, diesel Pullman trains are to take up on September 12. Between the up morning service from Wolverhampton to London and the down evening trip a return London-Birmingham service is to be given, the latter corresponding to the London-Leicester return trip of the Manchester-London Pullmans. Again, turn-round times, tight according to British ideas, are found in the 25-min. allowances at Birmingham and London. The "Bristol Pullman" is to make two full round trips a day, and here no turn-round time is less than half-an-hour. The provision of two classes of accommodation on both routes should give a high ratio of seats occupied. It will be interesting to see if the early departure from Wolverhampton and Birmingham (7 and 7.30 a.m.) will be well patronised, admirable though it would seem to be. In the Bristol and the Wolverhampton/Birmingham services local stops are to be made, at Bath and Solihull respectively, as a bid to improve the usefulness of the trains. Both early-morning up trains are booked into Paddington at 9.35, and so must run alongside on adjacent parallel tracks for the last two miles in from Old Oak.

Eating on the Train

THOSE who criticise meals taken on British Railways trains may sometimes have a case—holidays, staff troubles, and supply difficulties can cause disappointment even in one's favourite—and probably expensive—restaurant. But there are special difficulties for the restaurant on wheels in meeting the heavy demands which occur simultaneously and which must be satisfied courteously and efficiently from an absurdly small space usually travelling at speed and therefore battling with centrifugal force. Despite these difficulties, British restaurant cars can offer a three-course meal usually incorporating three alternatives for first, second, and third courses for 12s. 6d. The usual range of aperitifs and a good selection of wines, beers, spirits, and liqueurs are available at prices which compare very favourably with one's favourite—and expensive—restaurant. It is an odd fact that criticism of railway meals emanates from a public whose modern reputation for cooking is so poor that it is the laughing-stock of the gourmet's world: perhaps a parallel may be drawn with the case of the first-time traveller on an ocean liner who is easily recognised as such by the stewards because of his excessive grumbling.

Midland 0-6-0 Engines

THE sight of two derelict Johnson 0-6-0 freight locomotives outside Royston shed this month set us musing on the "Midland" goods motive power, not merely Midland Railway but London Midland & Scottish Railway also, until the coming of Sir William Stanier. This general type did not begin with Johnson, but with even earlier engines of Matthew Kirtley, powerful and efficient in their day. Johnson beautified and enlarged the type, and any true "Johnson" today must be 55 to 60 years old, at least according to the account books. Deeley added to the power and the number, though not departing much from the Johnson design except that he fitted 6-ft. wheels to three engines. With Fowler before the first world war came the much enlarged "3835" class; but though these were an advance on the Midland's small engine ideas, they were noticeably smaller than certain other 0-6-0 engines of the period, such as the "P2" and "P3" classes on the North Eastern. But the full disaster of these engines came not until 1926 when Fowler adopted them almost unchanged as the new standard L.M.S.R. goods engine, after George Hughes had begun to set a different pace with the Horwich "Crabs" of 2-6-0 form. Fowler was forced out of the small-engine policy by the "Royal Scot" decision; but not until the coming of Stanier's 2-8-0s in the mid-1930s was Britain's biggest railway given modern goods power of the size its traffic needed.

Braking Today

ONCE having started a train, the most important thing is to be able to stop it. This succinct statement of one of the elder statesmen of the North American railway world, Lewis K. Silcox, is today more important than ever with the general tendency to increase in train speeds, not in sheer speed, but in making more trains faster trains. Two recent news items focus attention on the braking problem. They are from opposite poles. The first is the very poor average goods train speed of 8.8 m.p.h. in the London Midland Region, as revealed by the 24-week statistics discussed on page 182 of our August 12 issue, and which shows again the extreme urgency of getting the great majority of British wagons fitted with continuous brakes as quickly as possible. That would not greatly improve the 3½ hr. out of 24 hr. in which a British wagon is actually moving, but it certainly would improve passenger train and general operation, for it would be in line with that most important principle: Look after the slow trains, the fast trains will look after themselves. The second news item referred to above is the decision to introduce a "Trans-Europe Express" goods service in 1961 in Western Europe, referred to on another page, and though 62 m.p.h. (100 km.p.h.) is to be the top speed, the corollary is that more trains will run at this speed, and for longer distances and up and down steeper gradients.

A Driver's Oversight

THE derailment last February of an express between Holmes Chapel and Sandbach provides yet another example of an oversight by a driver. In this case preparations for the building of a new bridge had necessitated a speed restriction of 10 m.p.h. The driver was aware of this, and at the inquiry held by Colonel Reed, claimed that he was not travelling at more than that speed. Yet the engine and first four coaches of the train ran 640 yd. past the first point of derailment. In these circumstances the inspecting officer could not accept the driver's evidence, and indeed estimates that the train entered the restricted zone at a speed of 45-50 m.p.h. Colonel Reed adds that he could only assume that for some undisclosed reason the driver was not alert. This accident therefore has been referred to the panel of medical and scientific officers who are examining such cases.

Austrian Locomotive Mileage

DEVELOPMENT of electric locomotive design in Austria during the past decade or so has been mainly along the avenues of increased power and ever better performance of constituent parts. As a consequence, the newer main-line classes are now making substantial mileages, and some of the rosters have been rearranged recently to give a maximum mileage of 28,000 km. (17,400 miles) in 30 working days.

The roster is actually a five-day one, and after three such turns a locomotive has a shed day, of 16 to 24 hr., before taking up the next three five-day turns. These duties apply to the 4,000 h.p. Co-Co locomotives of classes 1010 and 1110, which are used indiscriminately on heavy passenger and freight services. Because of the configuration of the country, long through runs are possible on certain days, particularly for locomotives shedded at Vienna West; but the natures and profiles of the main routes prevent high end-to-end speeds except between Vienna and Salzburg. Most turns involve through runs of no more than 185/195 miles (Vienna to Passau or Salzburg). The longest through run is from Vienna to Buchs, 466 miles, and on this trip the locomotive changes ends, as reversal of the train is needed at Salzburg; on this turn the locomotive runs from Vienna to Buchs in about 11 hr., and comes back after a short lie-over.

Diesel Factors in Africa

AN examination of one of the new English Electric line-service diesel locomotives for the East African Railways & Harbours this week was topical in view of general events in Africa; but also it gave rise to thoughts on African railways and African motive power now and in the future. Together, the railways in the Union of South Africa and in Egypt account for a substantial portion of the total mileage, total traffic and total motive power; and in equipment and intensity of traffic they resemble European railways rather than the other railways in the African continent. But what of these others in relation to diesel power? Is the structure of the motive power stock, to use a Central European phrase, changing? If it is, is it changing the structure of operation?

Now the traffic pattern on these other railways, these typical African railways, is not at all what it is in Europe. Passenger traffic in most cases is small; and freight traffic involves long hauls and sometimes heavy loads, but only rarely intense traffic. Perhaps in no more than three cases, at a rough estimate, has line capacity led to a consideration and trial of diesel units. Physical characteristics, such as gradients and tunnels, have only occasionally been the main reason for the replacement of steam by diesel, for example in Abyssinia and Eritrea. For the others, long gradients of 1 in 80 to 1 in 100 are more the order of the day.

Except for former French African territories there has been as yet no general elimination or reduction of steam motive power; indeed, two systems, the Benguela Railway and the Nyasaland Railways, have still to order their first line service diesel locomotives. Therefore, while the ex-French railways are 100 per cent diesel except for the Algerian and Moroccan electrified sections, and have a wide selection of railcars and locomotives, the introduction of diesel locomotives on other railways has been almost entirely for the operation of freight traffic, as with the Sudan 1,850 b.h.p. diesel-electrics of two makes, the various classes in Ghana and Nigeria, the Mozambique 1,100 b.h.p. units, and the English Electric 2,000 b.h.p. 1-Co-Co-1 locomotives in Rhodesia, though the last-named do haul all traffic on certain routes. Only in the Congo has any application of diesel power to shunting been made by public railways, mainly because the nature of traffic and train operation does not warrant special shunting power of any type unless it be for a few loco-tractors of 100 b.h.p. or so.

Has the extending use of diesel motive power, outside of the Union and Egypt, shown any tendency to change the pattern of train operation, and even full railway operation? The answer is a definite No. The principal reasons for the introduction of diesels have been the prospects of general economy, and in particular the savings in fuel costs, either because all the wood fuel had been cut down for miles around the line or because of possible savings in the haulage of locomotive coal for long distances from the ports. Also, the possibility of reducing locomotive crew wages was attractive, even though the wage rates were not high; while in certain cases, for instance, Tunisia, boiler water problems were enough in themselves to ensure conversion to diesel traction. But except on the eastern main lines in Rhodesia, in Sudan, where the powerful new diesels are expected to facilitate the handling of the cotton crop to the Red Sea, and in Kenya, where eventually it is hoped diesels will provide the extra line capacity now coming to be needed on the long main line inland from

Mombasa, the new form of power has not been expected to revolutionise operating methods or clear crucial heavily trafficked sections, but only to provide general economies under a variety of headings; and there is no sign, and perhaps no need for many years, that any striking changes in operating methods will result, even after several hundreds more diesels have been introduced.

It may be thought that maintenance and repair methods are likely to occupy so much time and effort that a definite attempt to change the operating structure would not be possible; but up to the moment there is little concrete evidence of that. The nationals of several African territories have proved capable of being trained into good maintenance fitters and servicing personnel as long as reasonable supervision continues. Yet no less important in this general African diesel maintenance question is that with the exception of the Sudanese, Rhodesian and possibly (in future) East African applications the diesel power is not worked really intensively; even in cases like the Cameroons, where substantial individual locomotive mileages are made, the load factor is not high, and the motive power and its constituents are not worn out by hard work. This is likely to continue in the future, for the main job of the diesels will be to reduce the cost per ton-mile on the basis of traffics as they are today. Only after a number of years will a reduction in cost per ton-mile be allied to substantial increases in traffics.

Road and Rail Competition in Victoria

THE volume of railway traffic is vitally linked with the prosperity of Victoria and the success or otherwise of industrial and population de-centralisation. This was stated by the Victorian Railway Commissioners in reply to the Secretary of the Victorian De-centralisation League, Councillor J. Mullin, who urged "freedom of transport anywhere in Victoria."

The Commissioners emphasised that the Railways had never sought a sheltered, protected position in competition with road transport. Having successfully introduced a progressive programme of modernisation and spent huge sums of money on improved rolling stock for the improvement of State-wide passenger and freight services, they were in a position to sell rail transport on its merits. What they did object to was unfair competition.

The Commissioners pointed out that because heavy vehicles did not make an adequate contribution for their road use, any increase in their numbers necessarily placed a burden on the community. There was less money for urgently needed road improvements, hospitals, schools, and de-centralised industries. On the other hand, the railway system was constructed from loan funds and faced an annual interest bill on its tracks and structures of about £3,600,000. This was only one of the reasons why road operators were sometimes able to offer lower rates than the railways.

The Commissioners went on to say that freedom of choice, as suggested by Councillor Mullin, could jeopardise de-centralisation of industry and ruin country traders. Loss of business by the railways could cause staff reductions throughout country districts, reduce the purchasing power of the railways, and influence the employment of a large section of the community.

The Railways have a staff of about 29,000 people, with their rolling stock and work force de-centralised throughout the State. It represented a capital asset of £158,000,000. The Railways paid wages amounting to £29,657,000 a year and of this sum, a considerable amount was paid to staff in country areas. Annual purchases of materials last year amounted to £11,000,000, and production at railway workshops was worth £4,500,000.

Special rail freight concessions on an extremely large range of raw materials and manufactured products, consigned to and from Victorian country industries, were granted by the Victorian Railways. They amounted to over £1,000,000 a year. In addition, further concessions were granted by the Government to de-centralised industries that were at a freight disadvantage compared with Melbourne manufacturers. Special rail freight contract rates were also granted from Melbourne to provincial centres in Victoria where trade had been established. They were valuable to both trader and manufacturer.

The Commissioners pointed out that if the Railways were

used to anywhere near their capacity, their unit costs would shrink appreciably, and a golden opportunity would be presented to reduce freight charges to the benefit of the country generally. The more flourishing became railway business, the more money could be made available by the Government to assist in the expansion of country industries.

Trials of B.R. Type "1" Diesel Locomotive

ONE of the first 10 B.T.H.-Paxman 800-h.p. diesel-electric Bo-Bo locomotives supplied to British Railways during 1957-58 for freight transfer duties in the London area of the London Midland Region has been subjected to road tests over a mileage of 2,530 mainly to determine the performance and related fuel consumption and at the same time to provide data for calculating train schedules. The British Transport Commission has published a comprehensive bulletin setting out not only the results of the tests but full details of the procedures adopted for carrying them out. Some of the main points are included elsewhere in this issue.

For locomotives such as the B.T.H.-Paxman unit with a maximum speed of 60 m.p.h. there is much in favour of the relatively simple transmission feature which it has, namely, four traction motors connected permanently in parallel and with only one stage of field weakening. One of the objects of the tests was to obtain sufficient data to demonstrate distinctive features of the electrical transmission system and results show a fractional advantage in overall thermal efficiency compared with another Type "1" locomotive design tested in which the traction motors are connected in series-parallel and have three stages of field-weakening. In the 800-h.p. unit the high percentage of field diversion produces a very large increase in current after the field change; this has a pronounced tendency to overload the engine. The response to the governor and load-control system is good and, although an appreciable drop in engine speed at the field change may be observed, the effect is of short duration and balanced conditions are quickly restored. An additional stage of field weakening would enable the road speed to be increased to 75 m.p.h. without exceeding the normal maximum peripheral speed of the traction-motor armatures.

By diesel-electric transmission standards the traction efficiencies for full controller working are very satisfactory; moreover, a high efficiency is retained over a comparatively wide range. Simplification is aided by the fact that, under normal circumstances, the traction-motor currents do not exceed 570 A. which is well within the maximum permissible value; for this reason overload current relays are not fitted. It was found that the rate of temperature rise at the traction-motor interpoles was slower than that obtained by the maker when running at the hourly rating current of 360 A. Therefore it is considered that there is a sufficient margin of safety for service running.

Although the specification to which the locomotive was built did not call for a lighter axleload than 17 tons the Paxman 16YHX diesel engine installed has a maximum rated speed of 1,250 r.p.m. and a specific weight of 15.75 lb. per b.h.p. which would have permitted the building of a lightweight locomotive. No advantage has been taken of this feature for the actual weight is 68 tons. In fact the bulletin states that for freight-transfer duties especially with loose-coupled wagons good adhesion is considered to be more important than low weight. With the existing design the full starting tractive effort of 40,000 lb. can be exerted without exceeding 26.2 per cent adhesion and therefore relative freedom from slipping may be expected.

It is significant that no fault arose serious enough to cause interference with the planned series of comprehensive tests. Minor defects such as the inability of the sanding gear always to prevent slipping under icy conditions, and the need to replace two radiator oil elements because of leakage, did not detract from the good day-to-day reliability of the locomotive throughout the tests. As received, the load regulator was subject to serious hunting: this fault was largely overcome by fitting an additional damping device in the pipe to the oil vane motor. Perhaps the most important defect was revealed during static load tests at Derby Works when it was found that, because of an incorrect adjustment to the governor, the power output of the engine was seriously deficient at full controller setting. Although the adjustment of a hydraulic-servo governor is one

of the more highly skilled tasks in diesel maintenance and one that should not be required frequently, faults of this kind do not often escape detection and quick rectification. Were they to be neglected much harm to machinery and consequent heavy expense could result.

Of the bulletin itself, which is priced at 10s. and available from the British Transport Commission, London, in interest and thoroughness of detailed explanation this is typical of the whole series concerning work conducted on behalf of the Locomotive Testing Joint Sub-Committee. Illustrations include a description and outline drawings of the locomotive, a schematic power circuit diagram, and 38 sets of curves which are fully explained in the text.

European Wagon Designation

TO replace the various wagon classification systems in use on Western European railways, a decision has been made by the U.I.C. (International Union of Railways) that as from July 1, 1964, all railway wagons will be accorded, and marked with, a standard classification system. This delay of four years is to allow the different member administrations of U.I.C. to change over gradually, and within that period any new wagons and wagons given a general overhaul may be marked either with the new classification number or with both the old railway and new international marks. Already a few have been so marked. This new classification is to be applied to all railway wagons, not merely to those operating in the Europe Pool.

In the new U.I.C. classification: E is to be for normal open types of two-axle wagons up to 20 tons capacity; F for open wagons of special type up to 20 tons capacity when on two axles, and up to 40 tons when on bogies; G for covered wagons of normal types on two axles, with eight or more ventilation openings, up to 20 tons capacity and with a body length up to about 8.0 metres; H for covered wagons of special types of up to 20 tons capacity on two axles or 40 tons capacity on two bogies; I for refrigerator wagons with normal insulation of up to 15 tons capacity on two axles and 30 tons on two bogies; K for normal two-axle flat wagons up to 20 tons capacity and of up to 12.0 metres body length; L for special two-axle flat wagons up to 20 tons capacity; R for normal flat wagons of bogie or four-axle types with a loading length up to about 18.0 m. and a capacity up to 40 tons; S for special flat wagons of bogie or four-axle types up to 40 tons capacity; T for covered wagons with sliding or fully openable roofs and a side-wall height up to 1.7 m., of 20 tons capacity on two axles and 40 tons capacity on two bogies; and U for other wagons, particularly special types such as tank wagons, pulverised coal wagons and so on, not included under classes F, H, L or S, and of 20 tons capacity on two axles or 40 tons on two bogies. Hitherto, the letter F has often been used for *fourgon*, or van, so that some different classification may be expected soon for this type of vehicle.

Two other points are worth remark. First, the use of sliding or openable roof and side wagons, like the SEAG and MacGregor-Comarain types, is now important enough to warrant a special classification letter; there are, of course, several thousands of such wagons at work, and with continuous developments in pallet loading their use must increase still further. The second point is that no special category has been made for very unusual wagons such as transformer trolleys, which at the moment are grouped under the heading U along with the more normal types of tank and other wagons.

Faster International Goods Services

DESPITE the development of containers and extensive use, more particularly in Central Europe, of the wagon transportation for door-to-door transport, road competition for goods traffic between European countries is becoming more acute. How transits for rail wagon-loads compare generally with those for lorry loads is not clear. The speeds of goods trains have been increased in the last few years, largely because of electric and diesel haulage. Much has been done to curtail customs formalities and service stops at frontiers; the latter have been cut by simplifying documentation of consignments and by running of through trains for certain international services. A good deal of time nevertheless is

still spent at frontier halts, and in marshalling, despite creation of new and improvements to existing, marshalling yards.

Quicker transits have been considered essential by the International Union of Railways (U.I.C.). For passengers quick journeys between major cities are afforded by the "Trans-Europe Expresses" (T.E.E.), multiple-unit diesel trains which run at high speeds; do not stop, or stop for a few minutes only, at frontier stations; and do not include individual through coaches.

A similar facility is felt desirable for goods traffic. Trains would be locomotive-hauled, but they would be, basically, through block trains, running at high speeds and with short stops at frontiers and for service purposes. This would supplement the work of the International Goods Timetable Conference (Livret International Marchandises), which has been in existence since 1923. The L.I.M. body includes 22 railway administrations, i.e., the principal systems in Europe except those of Albania, the Republic of Ireland, Portugal, Spain, and the U.S.S.R. The Czechoslovak State Railways is the managing administration. There are two conferences a year. At the autumn session general questions are discussed, and matters concerning less-than-wagon-load traffic. Timings of services are determined at the spring session when the tables in the international goods timetable (L.I.M. Kursbuch) are agreed. Under the auspices of the U.I.C. and within the framework of the L.I.M. a new organisation has been formed to develop international goods traffic. This bears the name T.E.E.M. ("Trans-Europe Express Marchandises"), on the lines of the T.E.E. group, which is part of the International Passenger Timetable & Through Carriage Conference organisation. Maximum speeds would have to be some 85-100 km.p.h. (53-62 m.p.h.) and trains must be given necessary priority by all railways concerned. Addition and uncoupling of rakes of wagons would be permitted at short halts. Maximum gross weight would be 1,000 tonnes and the maximum number of axles 100. Wagons in "T.E.E.M." trains would be marked [S] or [SS], as able to run at the required speeds.

Documentation, as consignment notes and customs declarations, will be carried out *en route* by railway staff before arrival at frontier stations, where the stops are not to exceed 2 hr.—which seems excessive. This might seem to lead to an increase in the number of men in the train crew, to deal with the paper work. These matters are being examined by the U.I.C. working party.

The German Federal Railway has already made provision in the 1960-61 timetable, which came into effect last June, for acceleration. Wagons conveying containers presumably can be moved in T.E.E.M.

Research, Design and Standardisation in India

IN succession to the Indian Railway Board Central Standards Office of British Indian times, the present Research, Designs & Standards Organisation, or R.D.S.O., covers a much wider area of activities. Since Independence in 1947 all important designing of rolling stock, locomotives and bridges formerly in the hands of consulting engineers in the United Kingdom has been carried out in India. An experimental investigation unit was also formed to collect information as a basis for designs to suit conditions peculiar to India.

In 1952 experimental expansion justified the creation of a separate Directorate, and the establishment of a Railway Testing & Research Centre at Lucknow. The next development took place in 1957 when the existing R.D.S.O. was formed under a Director-General; it employs a staff of over 1,000. Among the activities of the organisation are the designs of new types of locomotives, carriage and wagon stock, signalling equipment, track, bridges and buildings. Specifications and drawings of components are standardised for Indian manufacture and to use to the fullest extent indigenous materials.

Among the outstanding designs and decisions of the R.D.S.O. are those for the high-capacity "BOBS" (ore) and "BOX" (coal) wagons already described in these columns. The 23:9 ratio of tare to gross load of the former is remarkable. Even more important is the decision that in future all 5 ft. 6 in. and metre-gauge wagon stock shall be built to run on bogies. Considerable reductions in tare weight of carriages, from about 44 to 37 tons on the broad-gauge lines, have been achieved, enabling longer trains to be run and overcrowding to be

lessened whilst amenities are greater. Integral construction has made this possible. The new "WT" 2-8-4 5-ft. 6-in. gauge tank locomotive is the latest steam locomotive to be designed.

Steel bridge girders have been standardised in combination with prestressed concrete deck slabs, and prestressed girders also. It is stated that over 24,000 ft. of prestressed bridging has been completed or is under construction, though exactly what this means is not clear. Rail-welding, steel and cast-iron sleepers, and lay-outs for turnouts are all the concern of the organisation. Lengthy trials have established the "CST-9" as the most suitable sleeper for Indian conditions. It is of the cast-iron plate type, easy to manufacture with light-weight components and has considerable lateral rigidity and resistance to lateral and transverse thrust. Over 50 per cent of the 5 ft. 6 in. gauge track in India is already laid on this sleeper. The pressed-steel sleeper is also found to be quite satisfactory particularly for metre and narrow gauge. The various types of concrete sleeper are on trial as are flatter turnouts with 1 in 20 and 1 in 24 crossing frogs.

Research equipment is up to date and such instruments as the oscilloscope, alone or in combination with others, enables estimates to be made of stresses in parts of rolling stock movements of wheels, lateral forces on rails and stresses due to impact. Dynamometer car tests are found to be most valuable in assessing the efficiency of locomotives, aided materially by the use of fuel consumption test cars. Other work of the Research Section includes the testing of bearings, rubber fittings and other materials. Also analysis of stress in various rail sections is carried out with the aid of photo-elastic techniques.

A local mixture has been evolved for locomotive feed-water softening and indigenous ingredients are being used in paints and varnishes. Waste products such as coaldust and sawdust are being used to produce mortar and building blocks, and interior coach panel-sheets respectively. Soil testing is carried out not only in a central laboratory but also a mobile one used for site-tests.

Kowloon-Canton Railway

THE Acting General Manager of the Kowloon-Canton Railway (British Section), Mr. P. H. Lam, has sent us a copy of his report for the year ended March 31, 1959. Mr. Lam was appointed to relieve Mr. I. B. Trevor, who proceeded on vacation leave on October 3, 1958, prior to his retirement. Mr. Trevor joined the railway on December 5, 1924, as a Traffic Assistant, and had more than 34 years' service to his credit, having been appointed General Manager on May 1, 1946.

Mr. Lam's first report is able to feature the operational and financial success of transferring to diesel-electric operation. The five diesel-electric locomotives functioned with high efficiency and economy, with an availability factor of 97.53 per cent. Maintenance costs per km. dropped 16.81 per cent, and locomotive running costs were a further \$117,000 lower in 1958-59. The workshop staff was reduced from 261 to 246 as the diesel-electric locomotives require less maintenance than the steam engines, the latter being very rarely used during the year. The accounts show that no coal at all was purchased in 1958-59, the small amount used being taken from stocks.

Operating surplus and profit were the highest since 1950-51, and operating expenditure was the lowest since 1949-50. Local passenger traffic continued to expand, the number of journeys rising 6.73 per cent in 1958-59 over the previous year, but non-local passenger traffic declined markedly, by 36.25 per cent, in the number of journeys. Travel to and from China fluctuates from time to time according to the current Hong Kong Immigration Office and Chinese Government regulations, Mr. Lam points out.

Goods export tonnage was unchanged, but import tonnage increased 20.21 per cent, providing 7.63 per cent higher receipts. A record 264,728 head of pigs was imported.

The following are some of the principal purely railway results compared with those for 1957-58:—

	1957-58	1958-59
Railway operating revenue ...	\$ 8,067,073	\$ 7,758,589
Railway operating expenditure ...	4,191,348	3,606,795
Net railway operating revenue ...	3,875,726	4,151,794
Passenger receipts ...	5,330,660	4,861,244
Goods receipts ...	2,272,029	2,345,639
Train-kilometrage run ...	368,320	375,326

Letters to the Editor

(The Editor is not responsible for opinions of correspondents)

Victorian Railways Labour Dispute

August 12

SIR,—We noticed in your June 17 issue reference to a Victorian Railways industrial dispute. We feel that the paragraph may have given a wrong impression to your readers, particularly your reference to "retaliation" by the Railway Commissioners.

The facts are that the unions, having had a claim for a service grant rejected by the Arbitration Court, decided on direct action to gain their ends. This took two forms: first, a go-slow strike, by means of exaggerated observations of rules and regulations, and then by restriction on the time—96 hr. per fortnight—that they would allow their members to work. The 96 hr. included time with pay but not actually worked, such as sick leave, and holidays. The objective was to disrupt weekday workers' transport so that the public would cry "give the railwaymen what they want."

The Commissioners were able to maintain these essential services only by restricting other less important services such as Sunday trains that were eliminated (except for interstate trains) and cutting back the Saturday afternoon country services. You can see that this was by no means retaliation.

Naturally recruitment for an industry where industrial trouble existed became more difficult, but the railways, in common with most other industries in Victoria, are suffering a staff shortage which can be expected at periods of full employment.

Yours faithfully,

H. R. HAUPTMANN,

Chairman, Public Relations & Betterment Board

Victorian Railways, Melbourne

The Waterloo-Hounslow Line

August 9

SIR,—I must apologise to Mr. A. E. Durrant and to other readers for a minor error in my letter in your issue of August 6 on fares on the Waterloo-Hounslow line. The figure for the present day return fare should have read 3s. 2d. and not 3s.

This slightly diminishes my argument quantitatively but does not qualitatively affect its validity.

Yours faithfully,

F. D. Y. FAULKNER,
Public Relations Officer

Southern Region, British Railways,
Waterloo Station, London, S.E.1

August 9

SIR,—Mr. F. D. Y. Faulkner's reply in your August 6 issue seems to characterise the negative approach so prevalent on British Railways.

The only reason that the bus services are "more convenient" is that they are cheaper and more frequent, and it does not seem to have occurred to the Southern Region that the Hounslow line trains are lightly loaded because they are expensive, infrequent, and inconveniently timed.

Referring to the fares charged, Mr. Faulkner has ignored my comparison between British Railways and London Transport prices, and even with a 3s. 1d. return fare to Waterloo, the Southern return fare from Chiswick to the West End is 3s. 7d., or 20 per cent more than London Transport; so my argument is far from spoiled.

For the premium charged on travelling, the Southern return ticket also allows one long wait for the next train at Waterloo, where music is played to soothe the savage soul, and there is a refreshment room where, for an additional outlay, it is possible to consume watery, translucent tea or warm, cloudy beer.

From the tone of Mr. Faulkner's letter it seems that services on the Hounslow line are not to be made more competitive to satisfy the customer. May I ask him to consolidate his arguments by deleting the words "cheap" and "frequent" from hoardings at the relevant stations?

Yours faithfully,

A. E. DURRANT

7, Spencer Road, Chiswick,
London, W.4

THE SCRAP HEAP

The Décor or the Dames?

Bachelor commuter William H. Riha raised an objection—to the “Ladies only” carriages on the line between Newark and New York. A two-State commission dismissed his complaint. But was it that Mr. Riha wanted to see more of the ladies—or that he objected to the carriages themselves, decorated in watermelon pink, with rose petal walls, dove-grey ceiling and blossom-red wainscoting? The commission couldn't be sure.—*From the “Daily Express.”*

Faster than Time

A passenger at Ipswich Station has pointed out to officials that the local timetable makes trains between Ipswich and Felixstowe travel faster than time. According to the list, the 12.29 p.m. from Ipswich is booked to arrive at Felixstowe simultaneously and the 1.29 p.m. gets there 35 minutes before it departs. The timetable has been in use since June 12, but no one had noticed the mistakes. A new schedule is to be printed.—*From the “News Chronicle.”*

Lady Telegraphists (1910)

The new superintendent of the Great Central line is said to be responsible for the pending appointment of lady telegraphists. This is a new innovation on the part of the Great Central Company, and as the commencing salary is 5s. per week, with increase of 10s. on passing an efficiency test, and a maximum of £1 per week, the moral should be obvious. We understand that some of these young ladies are shortly to commence at Sheffield Victoria Telegraph Office, and that two or three male telegraphists are to be removed.—*From “The Railway Clerk” of August, 1910.*

Drivers' Distractions

In the evening [at the seaside resort of Platamona, in Northern Greece] the young men and girls walk out along the railway, straighter and more level than the road. Trains bring excitement—diesels from Athens going to Salonica, great transcontinental steam trains, with Istanbul, Belgrade, Geneva, Bruges written on their carriages. It is forbidden, nowadays, for girls to walk along the rails in bathing costumes. Once, on a hot day, Anna and a friend caused an accident; the driver, looking at them, hit the train in front. So now they dress decorously on the railway line.—*From “The Times.”*

U.S.A. Enthusiasts' Railway

The Tweetsie Railroad is a relic of the golden age of steam. A working railway until 1950, today it carries holiday-makers on a three-mile scenic route near Blowing Rock, North Carolina. It has just acquired its second steam locomotive the *Yukon Queen*, transported from Alaska to join No. 12, the only survivor of the line's original 4-6-0 engines. In its day, the Tweetsie carried coal, timber, and the local mountain people on a

60 mile run through the Blue Ridge Mountains between Johnson City, Tennessee, and Boone in western North Carolina. Flood damage and economic changes brought the line to its knees in 1950, but a few years later a group of railway fans bought and restored the remaining rolling stock . . . The railway has since become a leading tourist attraction . . . It was chartered as the East Tennessee & Western North Carolina in 1866, and christened “Tweetsie” by the mountaineers who lived within sound of its whistle. Lucius Beebe has written of the Tweetsie that “Its locomotives are Swiss-watch anachronisms with red-and-gold capped stacks red-painted cab window frames, and rod assemblies that might have come from a jeweller's display window.”—*From “The Daily Telegraph.”*

Sail on Rail

Many attempts have been made to use sails as motive power on railways. All have failed for practical purposes because a vehicle on a fixed track cannot tack or run in the face of the wind. One of the oldest such applications of sails is the *Aeolus* of the Baltimore & Ohio Railroad. Designed by Evan Thomas, brother of a President of the B. & O. RR., the vehicle is stated by the *Baltimore Sun* to have made its first run on January 24, 1830, with a sailing master from Chesapeake Bay at the helm. A reproduction of the *Aeolus* was a feature of the B. & O. Fair of the Iron Horse in 1928; it is shown in the illustration. Other railways on which sails were used were the Swansea & Mumbles; the isolated line from Kilnsea, in the East Riding of Yorkshire, along the spit to Spurn Head; a 3-ft. gauge quarry line near Cliffe, in Kent; the metre-gauge Jamnagar & Dwarka Rail-

way in India; and lines on the coast of Chile. With favourable winds, speeds of 34 m.p.h. are reported to have been attained on the Cliffe tramway and an average of 24 m.p.h. in India.

So Sorry . . . !

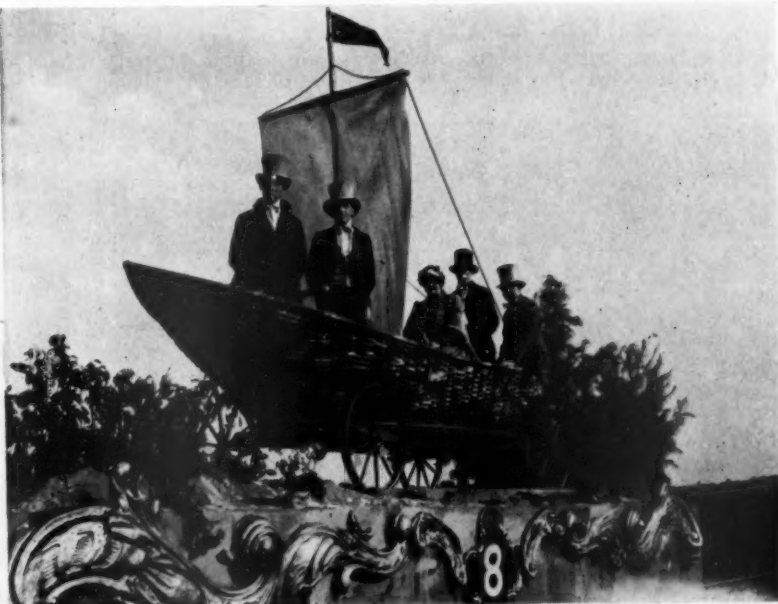
“Due to unavoidable circumstances air-conditioned class of accommodation available on 3 Up/4 Dn. Howrah-Bombay Mails . . . will continue to be provided daily until further advice.”—*From an announcement by the Eastern Railway of India in a Calcutta newspaper.*

Never Say Die

Retired railway workers in Hungary have formed themselves into a group to think out methods of running the railways more economically. Instead of sitting at home playing chess or fishing, they are now making long official journeys to big railway centres in the country, to talk over working methods and to give young workers the benefit of their knowledge. Their latest move has been to call a conference of secretaries of the country's 90 railway union branches to exchange experiences.

Chinese Laundry

Is the Hong Kong Government Railway more understanding than British Railways in its approach to the problems of the hard-working housewife? If shirts made in Hong Kong are imported in any bulk, British Railways might have a wash day problem to face when women bring their husbands' shirts to the permanent way in accordance with the instructions imprinted on one such shirt: “Iron collar by steam engine.” Perhaps it is as well that diesel and electric traction is replacing steam.—*Based on a letter in “Today,” of July 23.*



Sail-propelled car “Aeolus” of the Baltimore & Ohio Railroad

OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

PAKISTAN

New Steel Plant

A 250,000-ton steel plant is to be constructed near Karachi if the Pakistan Government approves the report of the United States firm, Koppers. Several firms in the United Kingdom, West Germany and Belgium are also interested in the project. Krupps have been asked to give a financial plan of the steel mill project. This steel mill will be based on imported raw material. A Japanese steel group is already working on a steel plant in East Pakistan. A considerable amount of track and other railway facilities will be needed to serve the plant.

NEW ZEALAND

Delivery of Sleepers

The largest single shipment of railway sleepers ever to come to New Zealand, 175,000, weighing 11,700 tons, has arrived in Wellington from Australia. A similar shipment is expected to arrive in December. The sleepers are not required for any specific purpose, but will be placed in stock. They are of jarrah. There are at present 8,000,000 sleepers in use in the railways throughout New Zealand. They have a very long life of 30-40 years, but every year a replacement programme is carried out, whereby main-line sleepers are taken out and placed on secondary tracks, and new ones put in their place. They remain there for a while, and then go into sidings.

EAST AFRICA

Kilindini Harbour Installations

Grant Lyon & Co. Ltd., a member of the Chamberlain Group of Companies, recently completed the railway installations at Kilindini Harbour for the East African Railways & Harbours. The

contract comprised the installation of 1,112 yd. of metre-gauge track with 16 turnouts, three diamond crossings, one scissor crossover, and four crossover units. The track is of 126 lb. dock rail laid on a continuous concrete foundation. The contract was completed in three months.

FRENCH SOMALILAND

Derailment of Express Train

Armed robbers derailed the Djibouti-Addis Ababa express on August 10, by placing boulders on the track. Three passengers, one reported to be a European were killed and eight others wounded in the mêlée which followed. The robbers took all the passengers' money, baggage, and other possessions.

ITALY

Motorcar Transport Wagons

Fifteen two-tier wagons for the transport of motorcars are being designed by the Italian State Railways. The lower deck will be slightly inclined, while the upper deck will be fitted with winches, a small stairway, and scotch blocks for the vehicles.

Catania-Syracuse Electrification

The electrification of the Catania-Syracuse line after that of the Messina-Palermo and Messina-Catania lines completes electrification work on the coastal lines in Sicily, with a considerable improvement in communications between the continent and the important tourist, agricultural and industrial centres of this region.

The higher speed of trains over steam trains permits an average time saving between Catania and Syracuse of 24 min.; the saving in time as a result of the adoption of electric traction will be

noticed next October in that the summer timetable has been laid out with the old running times of steam traction. Also, as a result of electrification, there is the considerable reduction in operating costs due, to a large extent, to the lower cost for the purchase of electric power as compared with coal, the consumption of which, on the basis of present-day traffic, is about 20,000 tons per year.

POLAND

Rolling Stock Exports

The value of rolling stock exported in 1949-59 was about £200 million, the second largest item of Polish engineering exports. The stock included passenger coaches, and tank and refrigerator wagons. The U.S.S.R. is the main purchaser.

U.S.S.R.

Electrification of Russian Railways

The Minister of Railways, Boris Beshchev, writing in *Pravda* on Soviet Railwaymen's Day, points out that the Soviet Union now ranks first in the world for length of electrified railways and rate of railway electrification. Forty-four per cent of the goods on the Soviet railways is carried by electric and diesel traction, he states. The volume of goods carried by electric and diesel rail traction in the Soviet Union this year is more than three times as great as the entire goods carriage of the railways of Britain, France, Western Germany, Italy, Austria, and Spain taken together.

Pointing out that the U.S.S.R. is now accomplishing the task of developing large electrified trunk lines, the Minister states that this year work will be completed on the electrification of the important Moscow - Kuibyshev - Cheliabinsk-Irkutsk section, with a total length of more than 3,200 miles.



Rail installations under construction at Kilindini Harbour, East African Railways & Harbours, left, and completed work, right

British Railways Diesel-Electric Locomotive Trials

Performance and efficiency tests of B.T.H.-Paxman 800-h.p. Bo-Bo freight-transfer locomotive of B.R. Type "1"

ROAD TESTS over a mileage of 2,530 have been completed by British Railways on one of the first 10 800-h.p. Type "1" diesel-electric main-line goods locomotives supplied during 1957-58 by the British Thomson-Houston Co. Ltd., now incorporated in the A.E.I. Traction Division. The work was conducted on behalf of the Locomotive Joint Sub-Committee of the British Transport Commission by the Chief Mechanical & Electrical Engineer's Department, British Railways, London Midland Region. Results are published in B.T.C. Bulletin No. 12 from which the accompanying curves and data are taken.

The locomotives are in service on freight-transfer work mainly in the London area, for which purpose they were allocated initially to Devons Road motive power depot, London Midland Region. They are of Bo-Bo axle notation with single cab over one of the bogies and two driving positions, one for each direction of travel. The power compartment is narrower than the cab and there is a short rear compartment housing the control equipment and certain auxiliaries. The locomotives weigh 68 tons and were designed for a maximum of 60 m.p.h.

The diesel engine is the Paxman 16YHX 16-cylinder vee-form four-stroke model de-rated to 800 b.h.p. Use of light alloys and lightweight construction have produced an overall dry weight of 12,600 lb. including ancillaries, i.e., 15½ lb. per b.h.p. Infinitely-variable speed regulation between 625 and 1,250 r.p.m. is obtained. A full description of the locomotive was given in our November 22, 1957, issue.

The tests were carried out to determine the performance and related fuel consumption of the locomotive over its working range and to provide data for calculating train schedules. A further object

was to obtain sufficient data to demonstrate the distinctive features of the electrical transmission system which has four traction motors connected permanently in parallel with only one stage of field weakening.

Static Tests

The locomotive selected for test was No. D.8208 which had already run 5,900 miles. Static tests at the diesel test plant at Derby Works, London Midland Region, showed that incorrect adjustment of the governor was causing the power output of the diesel engine to be seriously deficient at full controller. This was because the governor had not been correctly re-set after the removal for a minor modification on a previous occasion. Full rated output was obtained with correct adjustment.

A series of variable-speed road tests was carried out to obtain the current-speed characteristics of the traction motors and to show whether field diversion and unloading were occurring at the correct road speeds. It was found that these events were taking place prematurely, resulting in an appreciable deficiency in power at speeds above 50 m.p.h. The divert resistances were reduced by shorting out a number of turns, and this brought the speeds of diversion and unloading sensibly in line with the designed values.

The road trials took place mainly on the route: Toton-Leicester-Market Harborough-Derby-Toton, to a pre-arranged programme of constant speeds. Tests were conducted at six different settings of the driver's controller corresponding to nominal engine speeds of 700, 800, 875, 1,000, 1,125 and 1,250 r.p.m. which were selected to give an even distribution of settings over the normal working range.

Throughout each test continuous rec-

ords of road-speed and drawbar tractive effort were made on the Amsler recording table in the dynamometer car. Fuel consumption was measured by means of a precision grade displacement-type flowmeter recording electrically on the Amsler table in one-tenth gallon increments.

To demonstrate the practical application of the test results to normal service running conditions, a variable-speed run was made with a mineral load of 483.5 tons, comprising dynamometer car, 20 loaded 16-ton mineral wagons, and brake van. The timings for the run were estimated in advance from the performance characteristics established during the constant-speed tests. The test route on this occasion was Toton to Chapel-en-le-Frith via Derby and Chesterfield, returning via Peak Forrest, Ambergate, and Butterley. The timings were based on full power output, and the locomotive was worked in this condition throughout the run except when checked by signals or permanent way restrictions.

Efficiencies Achieved

At full controller setting the engine develops the maximum power required, i.e. 800 b.h.p., at 1,240 r.p.m. The auxiliaries absorb 34 h.p., and, for speeds above 15 m.p.h., the generator efficiency is about 94.5 per cent and the corresponding motor efficiency is 90 per cent, giving an inclusive efficiency of the electrical transmission of 85 per cent. The average rail h.p. is, therefore, 652 or 81.5 per cent of the b.h.p. developed. The drawbar h.p. is 620 at 15 m.p.h., falling to 520 h.p. as the speed rises to 50 m.p.h. because of the increase in locomotive resistance. The corresponding values of overall thermal efficiency are 25.8 per cent at 15 m.p.h. and 21.6 per cent at 50 m.p.h.

At 875 r.p.m. the engine b.h.p. is 338.

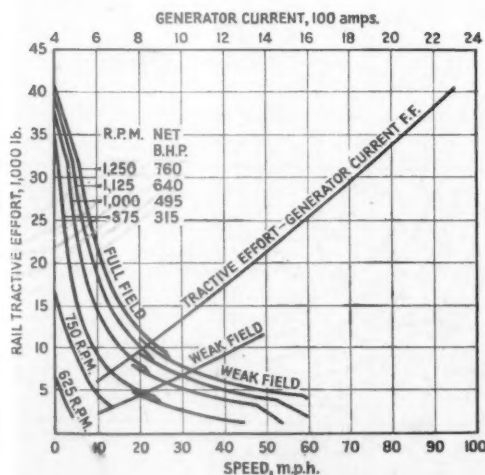


Fig. 1—Designed rail tractive effort characteristics

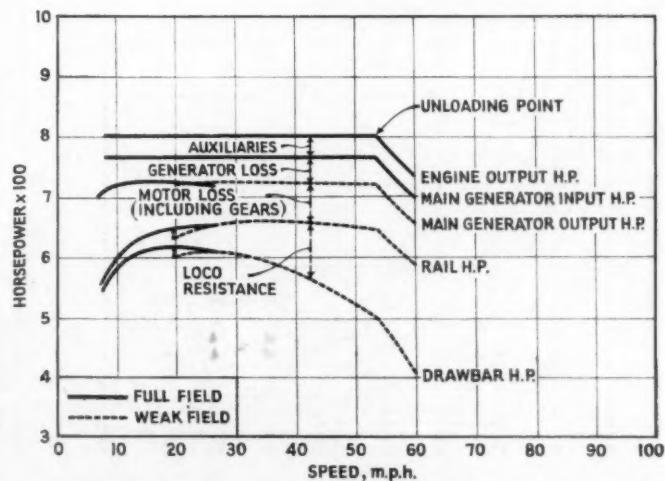


Fig. 2—Power distribution, engine at 1,240 r.p.m. to drawbar

The auxiliaries then absorb 28 h.p. Above 15 m.p.h. the generator efficiency is about 94 per cent and the corresponding motor efficiency 87.5 per cent giving an inclusive efficiency of 82.3 per cent for the transmission. The average rail h.p. is 255 or 75.4 per cent of the b.h.p. developed. The drawbar h.p. is 248 at 15 m.p.h., falling to 130 at 50 m.p.h. The corresponding values of overall thermal efficiency are 24.3 per cent and 12.75 per cent.

Fuel Consumption

The minimum specific fuel consumption of the diesel engine is 0.383 lb. per b.h.p.-hr. at about 1,050 r.p.m. This rises to 0.393 at 1,240 r.p.m. The maker's declared figure is 0.384 lb. per b.h.p.-hr. and the guaranteed figure is 5 per cent above this. The consumption at 1,240 r.p.m. is therefore 2½ per cent above the declared figure but well within the guaranteed value.

The electrical ratings permit a rail tractive effort of 22,000 lb. at 10.3 m.p.h. to be sustained for one hour with a main generator current of 1,440 A. The continuous current rating is 1,320 A. and the test results show that this permits 19,550 lb. rail tractive effort to be sustained indefinitely at 11.7 m.p.h. These figures are in close agreement with the values quoted by the manufacturer.

In the bulletin attention is drawn to fundamental differences in design between the 800-h.p. B.T.H.-Paxman locomotive

and the 1,000-h.p. British Railways Type "1" locomotives designed and built by the English Electric Co. Ltd. Whereas the smaller unit has a separate exciter for the main generator, the 1,000-h.p. unit has main-generator excitation supplied by the auxiliary generator and controlled by a torque regulator in the main-generator field circuit. The four traction motors are connected in series-parallel and have three stages of field weakening. These differences have some effect on the distribution of power from the diesel engine to the drawbar but the net result is reasonably similar for both locomotives.

With only one stage of field diversion in the 800-h.p. locomotive this has the obvious advantage of simplicity. The high percentage of field diversion produces a very large increase in current after the field change and this has a pronounced tendency to overload the engine. The response to the governor and load-control system is good and, although an appreciable drop in engine speed at the field change may be observed, the effect is of short duration and balanced conditions are quickly restored.

Although the specification called for the somewhat low speed of 60 m.p.h. the locomotive could run at 75 m.p.h. without exceeding the normal maximum peripheral speed of the traction-motor armatures, but to do this it would be highly desirable to make a corresponding increase in the speed at which unloading

occurs. This in turn would necessitate a greater percentage of field diversion which would require the provision of an additional stage of field weakening.

The traction efficiencies for full controller working are very satisfactory and compare favourably with those for other diesel-electric locomotives for which information is available. Moreover, a high efficiency is retained over a comparatively wide range.

Operating Characteristics

The equivalent tractive effort curves given on Fig. 3 are derived from the actual tractive efforts recorded on the Amsler table in the dynamometer car during tests at constant road speeds and constant engine speeds. A correction for gradient is made by adding the locomotive gradient resistance on rising gradients and subtracting it on falling gradients. A family of curves for available drawbar tractive effort for train weights of 300, 400, 500 and 600 tons express goods stock is included in the bulletin; of these, Fig. 4, for 300 tons, is shown here as an example. The curves were calculated by use of the equivalent tractive efforts shown on Fig. 3. Lines of total train resistance on the tractive effort curves so that the balancing speed which the train will reach on any gradient can easily be read. Contours of traction efficiency are also shown on Fig. 4.

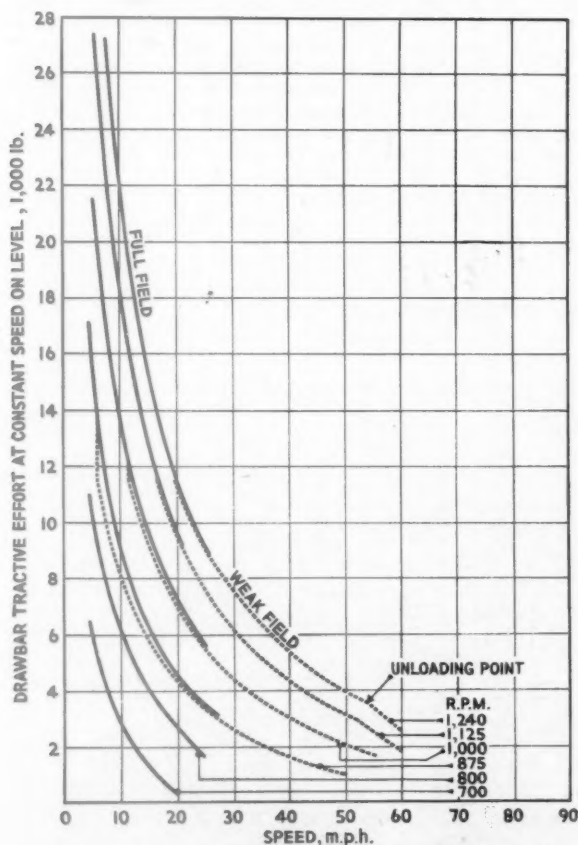


Fig. 3—Equivalent drawbar tractive effort characteristics

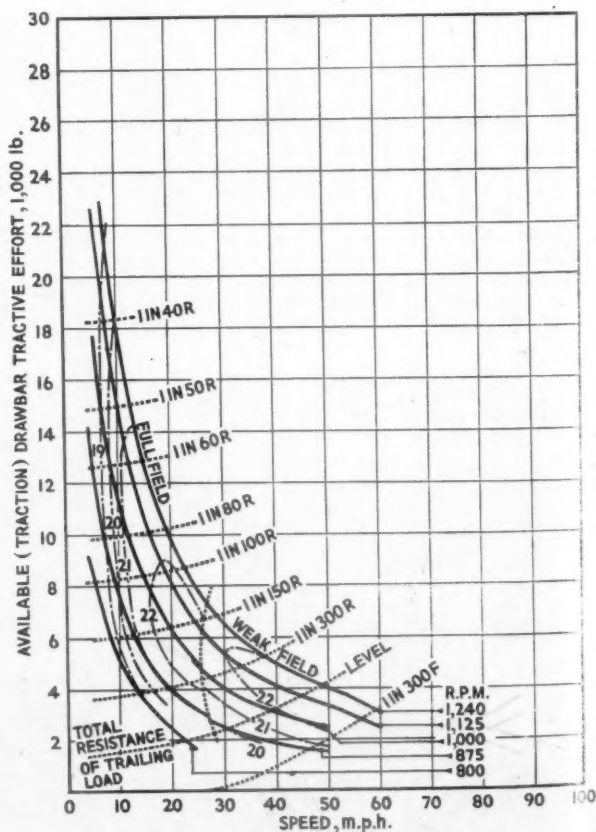


Fig. 4—Performance and tractive efficiency with 300 tons

Centralised Train Control on Rhodesia Railways

Installation of C.T.C. equipment for control of single-line sections of the main line from Umtali in the East to Ndola in the North

By D. H. Constable

Assistant Signals & Communications Engineer, Rhodesia Railways

CENTRALISED Train Control has been in operation on the Rhodesia Railways since September, 1951. By 1963 the main lines of the Rhodesia Railways, with the exception of the line to Malvern (Lourenço Marques), will be controlled throughout by C.T.C., except for the double line sections, and those stations where local control is being retained. At the moment, the C.T.C. installations in operation are as follow:—

Gwelo (exclusive)—Heany Junction (exclusive): Siemens General Electric single group system

Mpopoma — Gwaai (inclusive): Westinghouse Brake & Signal system, with carrier control on the Nyamandhlovu — Mpopoma (E) section

Gwaai (exclusive) — Wankie (exclusive): Siemens General Electric double group system

Wankie (exclusive)—Thomson Junction (exclusive)—Wankie avoiding line: Siemens General Electric double group system.

All these systems were installed by Rhodesia Railways Signals & Communications Engineer's staff. Many alterations have been made on these sections over the years.

The Gwelo—Heany Junction C.T.C. installation originally had hand-operated main line turnouts, electrically released from the C.T.C. panel. After obtaining a release, the train crew reversed the points for the train to enter or leave the loop, resetting after the improved punctuarity movement.

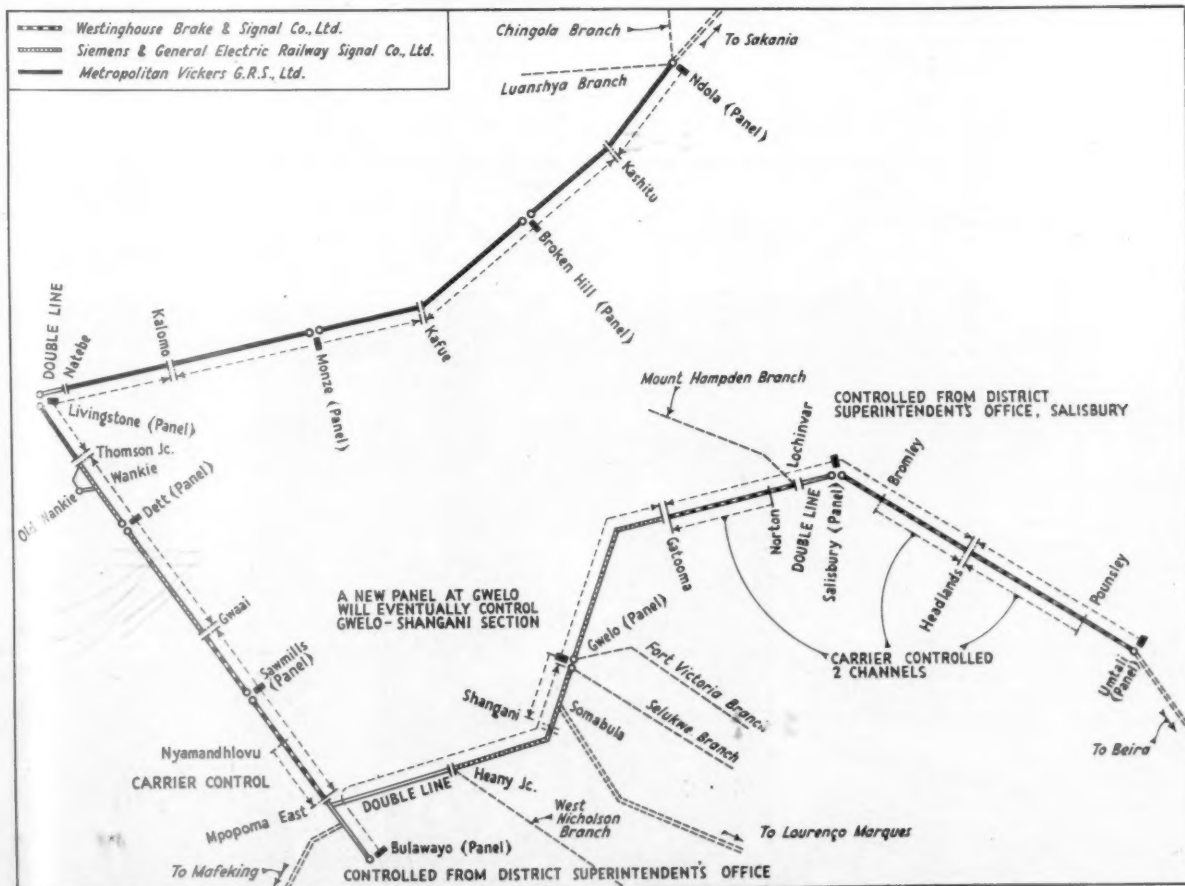
All main-line points are now operated from the C.T.C. panel and this has greatly improved time-keeping on the section. When this system was originally installed, it was necessary to send a control code from the panel to normalise signal circuits in the field after the passage of a train. Circuits have now been modified so that this is done automatically, thus reducing the calls on the supervisory apparatus.

The Mpopoma (E)—Gwaai C.T.C.

installation was originally supplied wired for hand operation of main line turnouts and the Signals & Communications Engineer's New Works staff altered the relay racks, panel, and so on, before installation, to allow for power operation of main line turnouts. The only major difference from the original Gwelo—Heany Junction C.T.C. system in so far as the control machine was concerned, was the provision of a separate switch for the home signal, together with separate indication. A key was provided for starting the diesel generators remotely from the panel and a lamp indication given that they were operating correctly.

Double Group System

The Gwaai—Wankie installation was the second system supplied by Siemens & General Electric Railway Signal Co. Ltd. and differed in various respects from the original C.T.C. installation between Gwelo and Heany Junction. It is known as the double group system. The control



C.T.C. on Rhodesia Railways, showing installations by British contractors



Signal diagram and console for Lochinvar (Salisbury) fabricated in the Signal & Communications workshops, Bulawayo

relays and equipment are located in a separate relay room remote from the control panel, whereas in the original

an intermediate siding, the main-line points will be put on local control and the train crew will operate them as

light points indicator will be illuminated below the starter to advise that the siding is on local control. After shunting has been performed the control will be handed back to C.T.C. This will greatly reduce the number of control operations to be made from the panel.

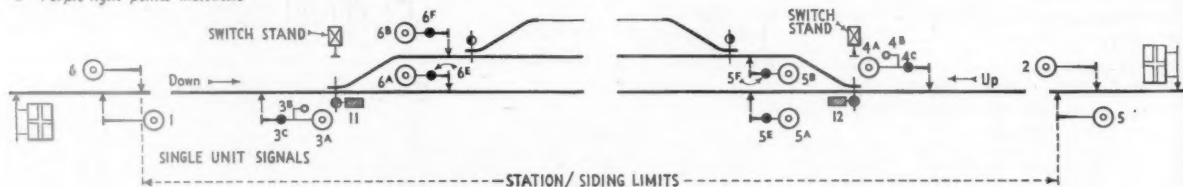
While on local control the position of the main-line points will not be continuously transmitted back to the panel for each and every move, and this will reduce congestion of the C.T.C. control lines.

Because of the extent of the proposed installations, it was decided to ask the main signalling contractors, Siemens & General Electric, Westinghouse Brake & Signal, and Metropolitan Vickers-G.R.S., for tenders for the supply and installation of C.T.C. from Umtali to Gwelo, and Zimba to Ndola. The erection of line wires, cable routes, installation of axle counters, ground frames, and much of the ancillary work was to be carried out by the staff of the Signals & Communications Engineer. Eventually contracts were entered into for C.T.C. sections as follow:—

Umtali - Gatooma: Westinghouse Brake & Signal Co. Ltd.

Gatooma - Gwelo: Siemens &

● Purple light points indicators



Typical C.T.C. layout with power-operated points and switch stands for shunting by train crews

system they were incorporated in the C.T.C. machine.

The Gwaai - Dett section of this panel allowed for hand-operated points and these were installed, but subsequently altered to power operation. The Dett - Wankie section was supplied already wired for power operation of points as there had been various incidents with wild animals on this section.

This Wankie-Thomson Junction C.T.C. panel was installed to control the Wankie avoiding line but, because of changed operating conditions in the coal-fields area, Wankie and the one intermediate siding, Tajintunda, are to be included on the Dett C.T.C. panel and this small system will be released for use elsewhere.

Standard Layouts

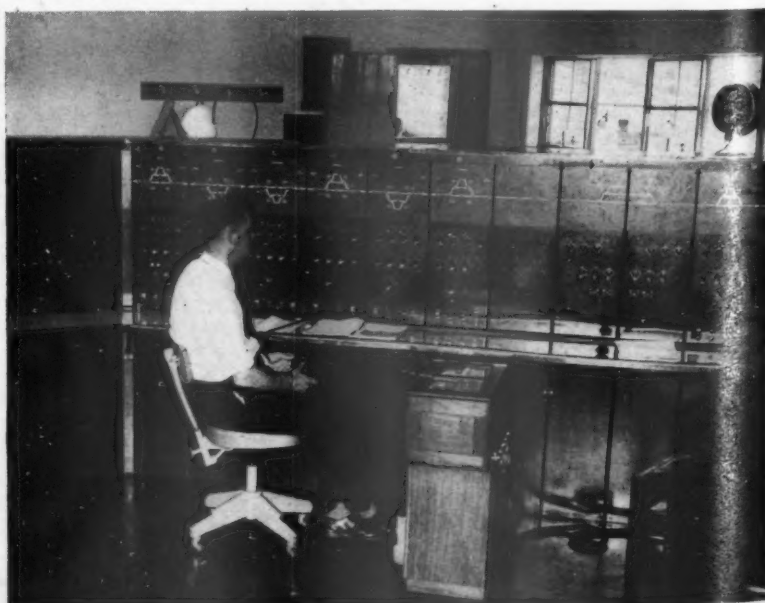
Around 1957 it was decided to review the whole operating procedure at sidings in the light of experience, and subsequently a new basic layout was involved. It was also decided that in due course the existing C.T.C. installations from Gwelo to Thomson Junction would be altered to conform with the new standards. The new standards ensure that when shunting is in operation, the train shunts towards a red light, the advance starter, and not a "Limit of Shunt" board.

When shunting is to be carried out at

required from a local control switch. At the same time, the applicable starter signal will be extinguished, and a purple

General Electric Railway Signal Co. Ltd.

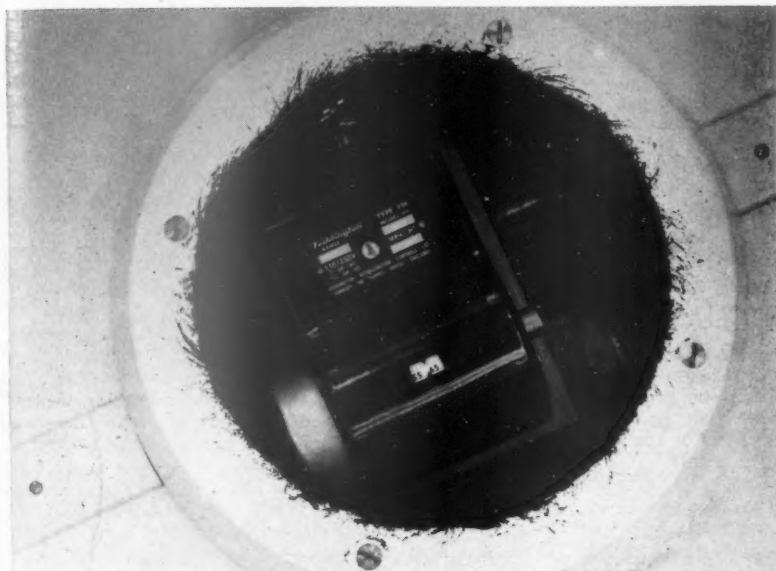
(Continued on page 218)



Centralised Train Control panel installed at Sawmills

Electric Heating Control in Coaching Stock

Sensitivity of temperature regulation improved through modifications carried out by British Railways, Southern Region



Ceiling air vent with grille removed to show thermostatic switch before final setting adjustment is made

THE satisfactory automatic regulation of air temperature in passenger coaches depends largely on the speed of response by thermostats controlling the heating system. Until early this year control of the electric heating of multiple-unit stock on the Kent Coast line of British Railways, Southern Region, depended on the action of a thermostatic switch positioned below the end seats of the open saloon, against the partition to the guard's compartment. Because the air circulation there was often limited, and the heating capacity installed was sufficient to warm the interior of each vehicle on cold mornings in about 20 min., conditions could arise in which short-term local overheating caused discomfort to passengers. For the same reason the interior temperature might drop considerably with the heaters off before the thermostatic switch was able to detect this condition and cause them to be energised again.

Thermostat in Air Vent

To improve the sensitivity of control it was necessary to locate the thermostatic switch where air circulation was greater than hitherto. As the coaches are ventilated by extraction of air through vents in the ceiling, the position chosen as being most favourable for operation of the thermostat was in the same open saloon as before, but raised from floor level to inside one of the ceiling-vent ducts. Total air extraction is at the rate of about four to five complete changes an hour. No power assistance is used so that this is almost entirely dependent on the train speed and relative wind velocity applied to the extraction ventilators on the roof.

With the new arrangement one thermostatic switch in the ceiling of each power car controls the temperature within acceptable limits in that vehicle and in the adjoining trailer. For entirely satisfactory operation of this system it must be assumed that the duration and extent of door- and window-opening is about equal in both vehicles of each set.

Some of the air which passes through the vent is directed by a baffle surround-

ing the gas bellows of the adjustable Teddington thermostat which is wired to a 70-V. d.c. control circuit. When live this circuit operates the relay coil in a single contactor which passes current to the heaters in the two vehicles from the traction supply, nominally at 750 V. d.c. Contactors are installed below floor level in each power car throughout the train. The control circuit can be interrupted by the train-heater master switch in the driver's cab at each end of the train formation which may be a two-car set for intermediate services, including a control trailer, or a four-car express unit. This rolling stock, built for phase I of the Kent Coast electrification scheme, was described in our June 12, 1959, issue.

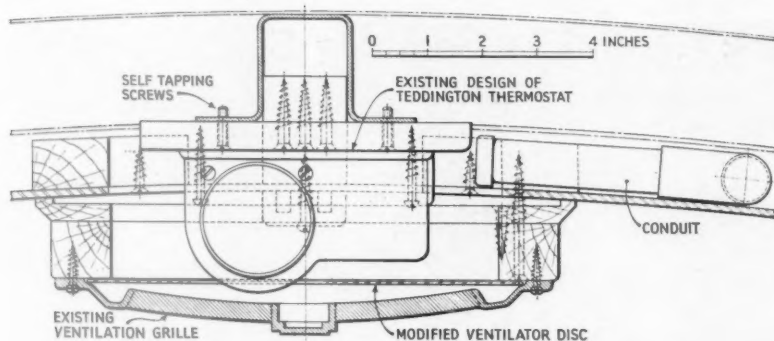
Heater Installation

In the second class open saloons of the composite stock the main support for the transverse two- and three-cushion seats is at the ends, so enabling air to circulate freely at floor level. On the average, heaters are installed below alternate seat benches; there the floor and all surrounding material is protected by $\frac{1}{2}$ -in. asbestos sheet. The most common rating of individual heaters, as supplied by the English Electric Co. Ltd., is 500W., with an insulated-strip element shaped in the form of a hairpin 2 ft. 2 $\frac{3}{4}$ in. long. This is mounted horizontally with the parallel portions set one above the other.

The heaters are wired in pairs in series; each unit is designed for operation on 340V. An aluminium deflector plate is shaped to promote good air-flow towards the lower part of the heater from both the front and rear, and thence



Heater unit (incomplete) below double seat in second class open saloon



Cross-section of thermostatic switch in modified air vent

upwards by convection, so achieving the maximum re-circulation. A vertical steel Expanmet litter guard, mounted flush with the edge of the seat, also eliminates any danger of personal injury by direct burning.

The deflector plates in compartment stock and below the end seats of open saloons are curved to draw air from the front of the bench only. In these loca-

tions the heater is sometimes placed centrally below each bench (this can also apply at the end of non-corridor saloons), in which case the element is 3 ft. 7½ in. long but still of 500 W. rating. In some compartments the shorter heaters are fitted at opposite corners; with either arrangement control remains with the thermostat in the saloon portion of the two-car set.

As a means of conserving as much heat as possible extensive use has been made of insulating materials in the construction of all the Kent Coast stock. For instance, glass fibre is packed in the sides of the body behind the trim panels and in the ends and fixed partitions. Asbestos is sprayed liberally inside the roof skin before the ceiling material is fitted in place. In addition double glass is used as an additional means of heat insulation. All these precautions also aid passenger comfort by reducing the transmission of noise.

Further Improvements

The heaters being fitted in first- and second-class corridor stock for Phase 2 of the Kent Coast electrification scheme have the element supported with the two parallel portions in the horizontal plane.

The change has been made mainly to increase the mean distance between the direct heat source and the litter guard so that the comfort and safety of passengers is ensured to an even greater extent than with the upright element arrangement described earlier.

Centralised Train Control on Rhodesia Railways

(Concluded from page 216)

Zimba - Ndola: Metropolitan Vickers-G.R.S. Limited.

The section Thomson Junction—Zimba had been let to Metropolitan Vickers—G.R.S. in 1956, but work was held up pending introduction of the new standards. Work is now well advanced on the Salisbury—Gatooma and Thomson Junction—Livingstone sections, and it is anticipated that these sections will be completed early in 1961.

Local Control

At large centres such as Gwelo, Livingstone and Broken Hill, and at certain stations where there is a large amount of shunting, a local signal cabin will be installed to control operations. The starter and advance starter signals leading into the adjacent C.T.C. sections will be jointly controlled by the C.T.C. controller and the signalman. This achieves greater flexibility and will allow the controllers to concentrate attention on the section working.

The operation of axle counters on the steel-sleepered sections of the Rhodesia Railways has been a problem. Where necessary, the sidings have had wood sleepers installed up to the home signals at each end of the siding, but the block sections are left steel sleepered. The Siemens Halske magnetic counter has been adopted as standard and has given very good results to date.

One of the most difficult troubles to overcome was the miscounting of engines fitted with flangeless wheels, but by fitting magnets to these engines the difficulty is being overcome. To help obviate lighting troubles, short track circuits were provided over the axle counter track devices so that when no trains are in

section the axle counter proving lines on the overhead pole route are permanently earthed.

Power Supplies

At almost every siding in Southern Rhodesia from Sawmills to Umtali, it has been possible to obtain power supply from the Electricity Supply Commission. Failure of the power is automatically shown on the control panel by an indication transmitted from the affected siding.

Diesel generators are installed at sidings where it is impossible to obtain a local supply. These generators are switched on and off by a control code, transmitted from control, and an indication is given on the panel that the generator has responded to the call. "Low Voltage Alarm" indications are transmitted from all sidings should the battery voltage fall below a pre-determined level.

Protection of Cables

On the earlier installations, difficulty was experienced with termites attacking the buried cables. Various chemicals were introduced into the cable trenches without success. It has now been decided to provide brass-taped cables wherever it is necessary to bury cables. Normally the cable running between ends of siding locations and between locations and home signals is suspended on rail pole routes.

Transport for the maintenance technicians is a Landrover where there is a good road running roughly parallel with the track and giving access to cut-section track circuit boxes, and so on, and on the more inaccessible sections small motor trolleys are used. Side tracking is provided at cut section boxes in the block section, and various other parts, and special C.T.C. train working regulations cope with their control.

When C.T.C. is complete the single-line sections of the main line of the Rhodesia Railways from Umtali in the east to Ndola in the north will be controlled from 10 control rooms. That is, approximately 1,200 miles of track will be controlled by colour-light signals.

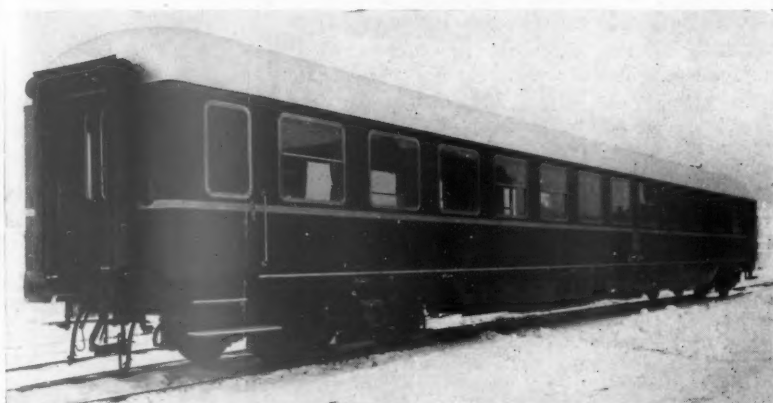
ROCKS FALL ON WESTERN REGION TRAIN.—Several tons of earth and rocks fell on to the main Paddington to Penzance line between Teignmouth and Dawlish, British Railways, Western Region, on August 11. The Kingswear—Exeter train was passing, but although 50 windows were smashed no one was injured. The train crew and passengers helped to clear the line.

INJURED GUARD ON LINE SAVED BY MATCHES.—A guard who had fallen from a goods train near Garswood, on the Wigan to St. Helens line, London Midland Region, British Railways, struck matches as he lay seriously injured on the track. He was in danger of being run over by another train. His signals with matches were seen by the fireman of a train on the adjoining line. The guard of this train attended to the injured man and the fireman ran 150 yd. to a signalbox in time to stop a train approaching on the track on which the injured guard lay.

SUMMER HOLIDAY RAILWAY COURSE FOR SCHOOLBOYS AT DONCASTER.—So that public and grammar schoolboys may improve their railway knowledge, British Railways, Eastern Region, has arranged a short works course at Doncaster, to give them an insight into the workings of the Railway Technical Departments. This five-day course, which includes lectures and discussions, is now being held in the Chief Mechanical & Electrical Engineer's department at Doncaster, and lasts until August 12. Contained in the programme are tours of the Doncaster Locomotive and Carriage & Wagon Works, Drawing Office, and Photographic departments; Penistone Electric Control Room; Reddish Electric Train Depot, and Lincoln and Doncaster Motive Power Depots.

Special Coach for Iranian State Railways

Combined sleeping and restaurant car and conference room for senior officers



Iranian State Railways combined sleeping and restaurant car and conference room for senior officers

ADDITIONAL to the main-line passenger coaches delivered to the Iranian State Railways as recorded in our issue of October 23, 1959, a special inspection coach for higher management officers has been supplied from Germany. Built by Orenstein-Koppel und Lübecker Maschinenbau A.G., this vehicle is a combined sleeping and dining car with a kitchen of its own and with a semi-open platform at one end. The dining saloon, 19 ft. 8 in. long, is so arranged that it can also be used as a conference room.

In its construction the coach is based on the design of the German 26-metre main-line stock, with an overall body length of 86 ft., and all-steel welded construction, and in frame, body struc-

ture, and bogies is standard with other recent Iranian passenger stock. Just within one end platform is a kitchen 16 ft. 2 in. long equipped with an oil-burning oven, hotplate, refrigerator, etc., and this is followed by a small equipment room. Then there is a lavatory compartment with douche, a compartment with three beds for the car staff, four compartments each with two beds, and finally the dining saloon. A side corridor runs from the end platform to the full width saloon.

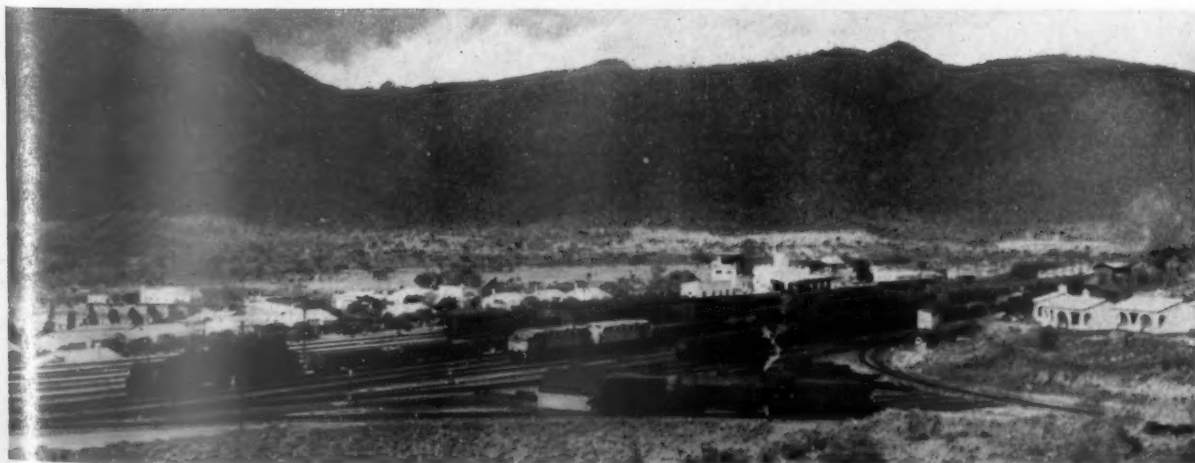
The sleeping compartments and dining-room are air-conditioned with the Jettair equipment supplied by Luwa, and similar to that already fitted to standard dining cars and other coaches of the Iranian State Railways.

The coach runs on two Minden-Deutz bogies with 37½-in. wheels spread over a bogie wheelbase of 8 ft. 3 in. and pitched at 62-ft. 4-in. pivots. Including water, oil for the kitchen, and other supplies the weight of the coach is 43 tons. This includes a 34-h.p. Daimler-Benz underfloor engine with attached generator and other electrical equipment, and a nickel-cadmium battery and silicon rectifier. This coach was sent on its own wheels from Germany, through the Balkans, over the Bosphorus train ferry, and over the Turkish and Iraqi Railways as far as Baghdad, where it was transferred on to a low-loader and sent via the metre-gauge line thence to Basra, and taken across the Gulf to Khorramshah, the port and terminus of the Iranian Railways.

MARTONAIR LIMITED CHANGE OF ADDRESS.—The Scottish office and stockroom of Martonair Limited has been moved to 128, Nithsdale Road, Glasgow, S.1. Tel. Pollok 3929.

MORE TOURIST ACCOMMODATION NEEDED IN U.K.—The British Travel & Holidays Association believes that last year's figure of nearly 1,400,000 tourists will rise to an annual total of over 2,000,000 by the mid-1960's; but it has been told that many thousands of intending visitors to Britain are now going elsewhere because of difficulty in finding accommodation. Mr. J. G. Bridges, Director-General of the B.T.H.A., has stated that inability to house potential tourists represents a serious loss to this country of foreign currency and of good will. The quality of accommodation, he adds, must be improved so as to compete with that offered in other countries.

Alterations on Rhodesia-Mozambique Frontier



Machipenda, in Mozambique, the interchange point between the Rhodesia and Mozambique State Railways, since transfer to Rhodesia Railways of the six-mile section from Umtali

British Transport Restaurant Cars

Restricted working areas and tight schedules combine to make the provision of meals on trains for large numbers an exacting task

By H. Simons

Assistant, Restaurant Car Administration,
British Transport Hotels & Catering Services

THE Hotels & Catering Services of the British Transport Commission operate 592 refreshment cars each day in the winter. Almost overnight, the change from winter to summer timetable increases the daily booked services to 794. These are served by a fleet of 850 catering vehicles of various types and ages (excluding Pullman Cars).

Deciding the Ideal Stock

In maintaining this fleet, the following problems recur: "What types, and how many of each, should be built? Should refreshment vehicles be maintained at a number greater than that at the disposal of the whole of Western Europe? Is the existing variety of types necessary?"

In 1954 we decided that part of the answer to the first question was to determine, on the basis of known requirements and likely trends, an ideal stock which could be acquired in limited yearly building programmes, subject to annual review.

This has proved to be a wise decision, for conditions have changed in the past four years. An ideal total stock of 596 was agreed and, in three years' building programmes, 420 new vehicles were authorised. The application of factors including work study, current develop-

ments in design, and buffet operations in electric and diesel rolling-stock already has necessitated a re-appraisal of our needs. A new pattern in transport is evolving and there will be no more programmes until substantial deliveries of the new vehicles have been made and further practical experience gained.

In determining the types of vehicles required, it was decided to take advantage of the experience of the staff which worked the restaurant cars. Initial designs and models were shown and criticism was invited. Staff suggestions were incorporated in three prototypes produced by carriage and wagon designers and engineers of the British Transport Commission in a remarkably short time: put in hand at Eastleigh Works in mid-1955, they were in operation by August, 1956. Constructive proposals from passengers using the new vehicles were then considered, and final designs agreed.

Standard Designs

Much of the equipment is standard to each of the following designs.

The Kitchen Car is a full coach containing kitchen, pantries, stores, refrigeration, crew compartment, and staff lavatory. Intended for use on heavily-

loaded, long-distance trains in conjunction with dining saloons, it can provide 224 main meals in one sitting.

The Kitchen-Buffer Car is 64 ft. 6 in. in length, and contains all the preparation and service facilities of the kitchen car on a reduced scale. The space saved accommodates a buffet counter offering a continuous light refreshment service.

Very Restricted Space

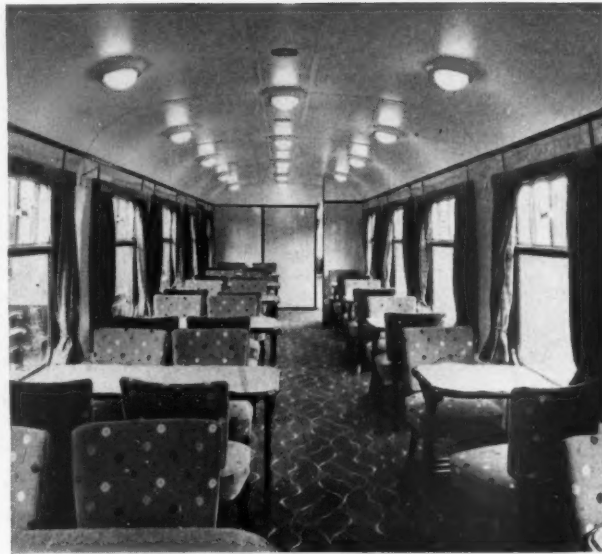
The 14-ft. 9-in. x 6-ft. 4-in. kitchen, smaller than that of a design approved officially for a council house, is a good example of the economic use of space.

In considering these dimensions it is worth reflecting that the Ministry of Health judges 100 sq. ft. to be the minimum space suitable for a domestic kitchen from which perhaps only a few meals are required at any one time. On a kitchen buffet car, only some 93 sq. ft. of space is used for producing many meals to a tight schedule. It is possible to serve up to 100 meals into two saloons simultaneously from this restricted area. Other refreshment vehicles successfully use even less space.

The Restaurant Car Unclassed is an entire coach of very compact design providing in one vehicle all the facilities needed for full *table d'hôte* meals, as



Interior of kitchen car



well as staff compartment, lavatory, and restaurant affording accommodation for 33 passengers. Free-standing chairs provide space and comfort. A variation of this design incorporates fixed seating.

The Restaurant Buffet is a single coach incorporating storage, kitchen, pantry, dining saloon (23 free-standing seats) and a buffet, staff compartment, and lavatory.

The recently-evolved miniature buffet uses only the area taken by 16 second-class passenger seats and provides a full service of hot and cold beverages and freshly-prepared sandwiches and snacks. It is in use on lightly-loaded runs and can be used for snack bar service on main-line trains to supplement a full restaurant car service.

The principle also has been applied to diesel multiple-unit stock. The initial cost of the miniature buffet is small; low maintenance is involved and staffing is economical. The design is believed to be unique.

In all these designs, every advantage has been taken of new trends in equipment. Always, the major factor has been the space problem.

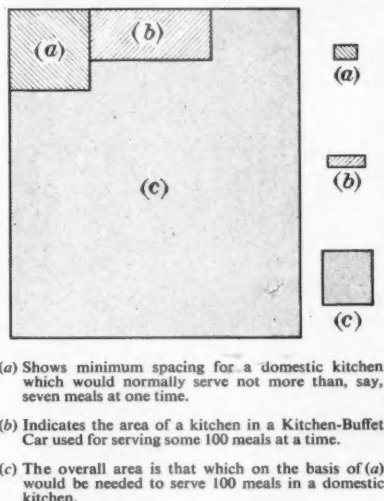
"Griddle" Car

The latest development is the "Griddle" car which, with the miniature buffet, was designed by Mr. E. K. Portman-Dixon, Chief of Restaurant Cars & Refreshment Rooms, to meet a new trend in public catering demands.

The standard means of cooking on British railway trains is by propane gas and there were new problems to be met in connection with a griddle plate. The co-operation of manufacturers of specialised cooking equipment resulted in the production of a gas-heated griddle which was successfully tested in the station buffet at Kings Cross. The main item for sale, cooked to order in under two minutes, is pure Aberdeen Angus beef, but other hot snacks are also covered.

This type of griddle is being installed in three experimental cars under construction at Eastleigh Works.

These vehicles will be put in service this year. The "Griddle" car will incorporate



(Top, left): kitchen buffet; (top, right): unclassified restaurant saloon; (centre, top and bottom): space available in a kitchen buffet and the effective way it is used

a separate bar service and modified designs are being considered for incorporation in diesel trains and electric multiple-units.

Specials

Probably the most complex problem of railway catering is that for special, relief, and excursion trains. Meals and snacks are provided on many thousands of special trains each year, hired for purposes ranging from a Sunday School outing to the journey of a party of industrialists.

In one Region, during a period of four weeks, as many as 213 special trains have been operated at a time when other demands were also high. Breakfast and dinner, with light refreshments in between, have been given to 6,000 passengers in the course of one railway journey.

Problems of these kinds are willingly accepted by restaurant car staff and management, even though the commencing point of a journey may be 120 miles from the nearest restaurant car depot and the catering staff engaged on a job may number more than one-third of the catering staff normally employed in the Region. Thousands of items of equipment and huge quantities of food have to be provided, a project made possible only by careful planning and the full co-operation of all concerned.

Prices

Meals in British Railways refreshment and buffet cars are good value for money and less expensive than their Continental counterparts. Experience of Continental restaurant cars frequently is gained on crack trains and in a holiday atmosphere, and leads unfairly, but understandably to an impression that Continental railway catering is better than our own.

Critics of British railway catering prices often forget that these must be fixed in such a way as to make a proper contribution toward overall costs and that they cannot be based solely on the intrinsic costs of the actual food and drink consumed. It has been well said



Prototype restaurant buffet, showing counter and seating arrangements



One of the first of the miniature buffets

that there is no hotel so expensive to operate as a restaurant on wheels.

A meal for two with half a bottle of wine and a liqueur recently taken on a Continental train cost £2 19s. 6d.—on British Railways, the bill would have been £1 10s. 6d. Despite taxation in Great Britain, charges for drinks on British trains are not greatly in excess of their Continental counterparts, with the possible exceptions of those of Italy and Spain.

Peak Difficulties

Acute problems often arise during holiday peaks. Mr. X and family travel, say, between the Midlands and Bournemouth. They expect to be on the well-known "Pines Express," with its dining facilities. Instead they find themselves required to travel on one of perhaps 11 reliefs. They may find a relief restaurant car or an alternative form of refreshment service, or even nothing at all. It is impossible to cater *ad libitum* on individual days, but there are always refreshment rooms and packed meals.

In 1959, over 11 million meals were served in refreshment cars. The travelling staff exercises a highly-skilled technique, often in cramped conditions, and perhaps after a boring wait in sidings. Change-over of vehicles or mechanical breakdown often involves last-minute moves of food and equipment. No other form of catering involves difficulties of this kind.

Despite these obstacles, the work still attracts. The intake of younger staff is especially heartening and, coincidental with the delivery of a new fleet, full-scale training schemes have commenced at New Lodge, Windsor. Here, trainees learn everything from preparing and cooking potatoes to the service of an elaborate banquet. At Old Oak Common in the Western Region there has been great keenness on the part of volunteers for further training under actual vehicle conditions.

Grain Conveyors for Off-Loading

Greater efficiency obtained in transfer operations

THE use of conveyors to off-load grain from railway wagons to road carriers greatly facilitates and expedites the operation. It enables 10-ton bulk road carriers to be filled directly from railway wagons in 3-5 min. Two inlets to the conveyor are installed in positions coinciding with the discharge points of two 20-ton bulk railway wagons.

Revolving Screw Feed

The grain is drawn into the conveyor tube, and a continuous flow is ensured by a revolving screw. It is then carried to an overhead storage bin at a rate of 40 tons an hour. It is discharged by gravity feed.

The 41-ft. Mayrath conveyor was supplied by Gordon Felber & Co. Ltd., Spirella House, Oxford Circus, London. It is installed at the railway siding of the mill of A. & W. Evans Limited, Leicester.



Mayrath grain conveyor installation at Leicester

RAILWAY NEWS SECTION

PERSONAL

We very much regret inaccuracies in last week's obituary of the late Mr. Roger Gresley, which were the result of incorrect procedure, and not of lack of knowledge in this office. Mr. Gresley joined the Metropolitan-Cammell Carriage & Wagon Co. Ltd. in 1928.

We regret to record the death of Mr. J. W. Walker, Area Sales Manager, British Transport Advertising, Manchester.

recorded in our last issue, but will conclude his term of office at the end of this year, when, as recorded, his duties will be taken over by Mr. W. H. Rathbone.

We regret to record the death of Mr. W. C. Goodchild, late Chief Outdoor Assistant, Derby, Chief Mechanical Engineer's Department, former L.M.S.R. Mr. Goodchild began his career with the Midland Railway at Leicester in 1893, in the position of Resident Engineer in charge of the gas-power

Colonel Donald Cameron, of Lochiel, has been re-appointed a part-time member of the British Transport Commission.

Mr. S. F. Dingle, Vice-President of Operation, Canadian National Railways, who, as recorded in our August 12 issue, has been appointed System Vice-President, has had 30 years of experience in the Engineering and Operating Departments of the Canadian National and its predecessor companies, and has served on operating and special



Mr. N. J. MacMillan
Executive Vice-President, Canadian National Railways



Mr. S. F. Dingle
Appointed System Vice-President, Canadian National Railways

Mr. N. J. MacMillan, Executive Vice-President, Canadian National Railways, who will be responsible for all activities related directly to the marketing and operation of C.N.R. transportation services from September 1, was born at Bracebridge, Ontario, in 1909. He graduated from the University of Manitoba, and from the Manitoba Law School. After practising law at Winnipeg for several years, he joined Canadian National as a solicitor in the Law Department at Winnipeg, and was subsequently promoted to be Assistant General Solicitor at Montreal in 1943. In 1945 he was appointed General Counsel, and in 1949 he became Vice-President & General Counsel. In 1956 he was appointed to his present position of Executive Vice-President. Reference to the re-organisation of C.N.R. headquarters and to Mr. MacMillan's new responsibilities is made in our editorial columns on page 205.

Mr. C. W. Evans, President of the National Union of Railwaymen, has not retired, as

electric generating station. In 1898 he was transferred to Derby to act as Assistant to the Telegraph Superintendent. His duties included the supervision of L.M.S.R. generating stations. In 1903 he was placed in charge of mechanical and electrical maintenance of the power stations. In 1906 the maintenance of the hydraulic power plants and machinery, locomotive water supply, gasworks and gas lighting, weighing machines and manual cranes were successively added to his duties as Outdoor Assistant to the Chief Mechanical Engineer. Mr. Goodchild had a specialist knowledge of power station operation, oil gas manufacture, combustion and fuel economy, and the effect of the quality of waters in locomotive boilers. On January 25, 1929, he was appointed Chief Outdoor Assistant, Derby, Chief Mechanical Engineer's Department. He was also a representative of the railway companies on the National Illumination Committee, and a Member of the Institution of Electrical Engineers and of the Institution of Mechanical Engineers.

committees of the Association of American Railroads and of the Railways Association of Canada. Mr. Dingle, who is 48 years of age, was educated at the public and high schools at Winnipeg, and took special studies at the University of Manitoba. He started his railway career in 1920 in the Engineering Department of the Grand Trunk Pacific Railway at Winnipeg. He became Secretary to the Assistant General Manager of the Western Region, Canadian National Railways, in 1923, and in 1925 was made Secretary to the General Superintendent of Transportation of that region. After serving as Chief Clerk in the Transportation Department at Winnipeg from 1930 to 1939, he was appointed Assistant Superintendent at Dauphin, and he was promoted to be Superintendent of that division in 1941. He was Divisional Superintendent at Winnipeg from 1942 to 1944, when he was appointed General Superintendent in charge of the Alberta District. In 1946, Mr. Dingle was selected for the post of Chief of Transportation for all Canadian National lines, with



Mr. H. C. Grayston

Appointed Vice-President, Transportation & Maintenance, C.N.R.



Mr. A. H. Hart

Appointed Vice-President, Sales, Canadian National Railways



Mr. S. H. McNeilly

Appointed Assistant Comptroller, Canadian Pacific Railway

headquarters at Montreal, and he was appointed in 1948 to be Assistant Vice-President of Operation. Two years later he was appointed to the position of Vice-President of Operation.

Mr. H. C. Grayston, Assistant Vice-President of Operation, Canadian National Railways, who, as recorded in our August 12 issue, has been appointed Vice-President of Transportation & Maintenance, was born in Wimbledon, England, and began his railway career as a clerk in the Toronto accounting department of Canadian National Railways in 1916. He transferred to the operation department three years later and was promoted through a series of positions to Chief Car Distributor, Montreal, in 1928. After a period as Chief Clerk in the transportation department he was made General Supervisor of Car Service, and in 1948, was appointed Chief of Car Service. Three years later he was appointed Manager of the Newfoundland District. Mr. Grayston moved back to Montreal in 1954, and assumed the duties of Special Assignments Assistant under the Vice-President of Operation. In 1957 he was appointed to the position which he now vacates.

Mr. P. A. White, Assistant General Manager (Traffic), Southern Region, has been elected a Director of Aldershot & District Traction Co. Ltd.

B.T.C. APPOINTMENTS

The British Transport Commission has announced the following appointments:—
Finance Department

Costings Division: Mr. F. J. Sykes, Assistant Traffic Costing Officer, Glasgow, to be Traffic Costing Officer, Glasgow.

British Railways Central Staff

Traffic Department: Mr. H. Hoyle, Movement Officer, Liverpool Street, Eastern Region, British Railways, to be Operating Officer; Mr. T. V. Nicholson, Freight Rolling Stock Officer, to be Rolling Stock Officer.

Signalling Engineer Department

Mr. E. A. Webster, Assistant (New Works), Signal Engineering Department, Reading, Western Region, British Railways, to be Assistant (General Duties); Mr. S. L. Higgins, Executive Assistant, Signal Engineer's Department, London Transport Executive, to be Assistant (Equipment).

Mr. A. H. Hart, Vice-President of Traffic, Canadian National Railways, who, as recorded in our August 12 issue, has been appointed Vice-President of Sales, was born in Regina in 1928, and educated in Nova Scotia. He graduated from Dalhousie University in 1939, and received his L.I.B. there in 1947. He served with the Royal Canadian Artillery during the 1939-45 war, and retired as a major. After service as solicitor in the Department of the Attorney-General, Nova Scotia, he joined the C.N.R. Law Department in 1949 as Assistant Solicitor at Montreal. He was promoted to be Associate Commission Counsel in the Law Department in 1953, and was transferred to the Traffic Department. He became Vice-President of Traffic last year.

Mr. G. R. Fitt has been appointed Building Superintendent, Windsor Station, Headquarters, Canadian Pacific Railway, Montreal.

TRANSPORT USERS' CONSULTATIVE COMMITTEE SOUTH EASTERN AREA

The following appointments have been made to the Transport Users' Consultative Committee for the South Eastern Area:—

Chairman

Mr. M. H. Pugh.

Members

Mr. L. G. Mizen and *Mr. T. A. Gazzard, representing agriculture; Mr. P. Kelvin-Johnson, Mr. W. G. Crowhurst, Lt.-Colonel C. W. Brannon, and Mr. R. J. Davie, representing industry; Mr. W. Comben Longstaff, representing shipping; Mr. J. E. Brown and Mr. G. H. Parks, representing labour; County Councillor Colonel The Rt. Hon. Lord Basing, County Councillor Captain E. H. Longsdon, Alderman A. V. Nicholls and *Councillor F. Lines, representing Local authorities; Mr. A. J. Wright, and *Mr. F. P. B. Taylor, representing British Transport Commission; Lt.-Colonel Sir Mervyn Wheatley, Additional Member.

* Indicates new member.

Three members have yet to be appointed, one to represent agriculture, another local authorities, and one additional member.

We regret to record the recent death of Dipl.-Ing. E. Gautzsch, Manager of the Home Sales Department, Krauss-Maffei A.G., of Munich. His earlier professional life had been in signal engineering, with the Vereinigte

Eisenbahn & Signalwerke (now Siemens & Halske) at Brunswick.

Mr. S. H. McNeilly, Manager, Integrated Data Processing Centres, Canadian Pacific Railway who, as recorded in our June 17 issue, has been appointed Assistant Comptroller, was born and educated in Western Canada, and joined the Canadian Pacific in 1920. Two years later he joined Dominion Express Company, which later became Canadian Pacific Express. He filled various positions with the Express Company until 1955, when he returned to the railway as Supervisor of the Data Centre, Toronto. In 1956 he was appointed Assistant Chief, Montreal Data Centres, and promoted to be Chief in 1957, with jurisdiction over the Mechanised Data Centres located at strategic points across the C.P.R. system. In 1958, when this function was combined with the Computer Centre Operation, he was appointed Chief, I.D.P. Centres, and was appointed Manager, I.D.P. Centres a year ago.

INSTITUTE OF TRANSPORT AWARDS 1959-60

The Institute of Transport has announced the following awards for papers submitted during the 1959-60 session, and in respect of successes at the Institute of Transport examinations held in 1960:—

British Transport Commission Awards

To Mr. A. J. White, formerly Assistant General Manager, British Railways (Eastern Region), for his paper on "The future of co-ordination between rail and road"; Mr. A. S. Mountfield, General Manager & Secretary, Mersey Docks & Harbour Board, for his paper on "A port in relation to the national economy"; to Brigadier A. E. M. Waller, Head of the International Transport Branch, Ministry of Transport, for his paper on "European transport policies"; Mr. J. C. Todd, Assistant Engineer, Nigerian Railway Corporation, and Mr. J. B. Hutchison, Clerk, British Railways (Scottish Region), for meritorious performances in the Associate Membership Examination.

Mr. T. E. Jackson, Freight Commercial Officer, South Eastern Division, Southern Region, who, as recorded in our July 29 issue, has recently retired, joined the former Midland Railway in 1915 and



Mr. T. E. Jackson
Freight Commercial Officer, S.E.
Division, S. Region, who has retired

subsequently became a member of the Chief Goods Manager's personal staff. After the formation of the L.M.S. Railway, he was transferred to Euston, and was appointed Deputy Head, Accommodation, New Works & Tenancy Section at Euston in 1931. In 1936 he became Relief Goods Agent, London District, and was appointed Goods Agent, Rochdale, a year later. He gained further experience as Goods Agent, Oldham Road, Manchester, in 1942; Operating Assistant to the District Goods Manager, Manchester, in 1943; and Assistant District Goods Manager, at Bolton in 1944 and at Manchester in 1947. From 1948 to 1952 he was Assistant (Claims) to the Commercial Superintendent, London Midland Region. In 1952 he was appointed District Goods Superintendent, London Bridge, Southern Region, a position which was re-designated District Goods Manager in 1955. He became Freight Commercial Officer, South Eastern Division in 1958. He is a Member of the Institute of Transport, and was Chairman of the Metropolitan Conference and London Commercial Service Control Committee (Freight Traffic) in 1954 and 1956.

Sir Leslie Gamage, Chairman & Managing Director of General Electrical Co. Ltd., is to retire at the end of this year.

Mr. R. R. Huitson, has been appointed Consultant to the heavy plant division of Associated Electrical Industries Limited

Mr. J. H. Shiner and Mr. H. A. Wallace have been elected Directors of Massey-Ferguson Limited. Mr. C. F. Herrmeyer and Mr. R. W. Main have resigned from the board.

THE LATE MR. H. E. B. CAVANAGH

The funeral service for the late Mr. H. E. B. Cavanagh, was held at Havenstreet Church, near Ryde, Isle of Wight, on August 9. In addition to family mourners, the following were among those present:—
Western Region

Mr. S. Gray, Assistant to General Manager Western Region, also representing Mr. J. R. Hammond, General Manager; Mr. C. J. Rider, Public Relations & Publicity Officer; Mr. P. Jacobs, Assistant to Signal Engineer, New Works, also representing Mr. A. A. Cardani, Signal Engineer; Mr. H. Chubb, Regional Welfare Officer, also representing

Mr. S. G. Ward, Regional Establishment & Staff Officer; Mr. G. G. Gibbon, representing Mr. J. W. J. Webb, Regional Accountant; Mr. A. L. Carr, General Secretary, Western Region Staff Association.

Chief Civil Engineer's Office

Mr. M. G. R. Smith, Chief Civil Engineer, also representing Sir Allan Quartermaine; Mr. H. Savage, Assistant Civil Engineer, New Works, also representing Mr. E. C. Cookson, Assistant Civil Engineer, and Mr. C. W. Powell, Operating Officer; Mr. N. S. Cox, District Engineer, Plymouth, also representing the District Engineers; Mr. E. A. Taber, Principal Assistant Architect; Mr. F. Bye, Staff & Administrative Assistant to Chief Civil Engineer; Mr. E. J. Outram, Steelwork Section, also representing Mr. P. S. A. Berridge, Steelwork Assistant; Mr. K. W. Pearce, Assistant District Engineer, London District, also representing Mr. S. Stevens; Mr. J. Mahy, New Works Section, also representing Mr. G. E. Telford, New Works & Modernisation; Mr. W. M. Bebbington, Road Bridge Assistant; Mr. N. M. Bebbington, Personal Assistant to Chief Civil Engineer.

Members of the Architect's Staff: Mr. R. D. Dew, Mr. T. P. Wurr, Mr. G. F. Putwain, Mr. R. Owen, Mr. T. E. Meddings, Mr. A. Andrews, Mr. R. E. Farndon, Mrs. M. H. Kriesis, Mr. R. F. Turner, Mr. R. Bishop, Mr. M. J. Pagulatos, Mr. D. Pearce, Miss M. B. Barnard, Mr. P. G. Payne, retired member of the Steelwork Office.

Others present

Mr. R. L. Moorcroft, representing Mr. C. W. King, B.T.C., and Dr. F. F. Curtis, Architect to B.T.C.; Mr. W. R. Headley, Regional Architect, L.M. Region; Mr. G. G. Pembury, representing Mr. H. H. Pittaway, Architect, Southern Region; Mr. G. Handcock, representing Messrs. W. H. Streeter Limited.

AN APPRECIATION

Dr. Frederick F. Curtis writes in *The Times*:—

"A short notice among the obituaries in *The Times* has referred to the tragic death in a sailing accident of Howard Cavanagh, the architect of the Western Region of British Railways. I should be grateful if you would allow me, as a colleague and friend, to add a few words in memory of a man of great professional ability and personal charm whom all who knew him will miss with a deep sense of loss.

Much of his work as an architect has still to be completed, like the new station at Plymouth (the design of which can be seen at the Royal Academy Summer Exhibition), and more, alas, may remain forever merely a project, but what he has achieved will always bear witness to his imaginative and unconventional personality.

He was what is called an "official" architect, a description conjuring up the image of a desk-bound pedant: in fact he was a man who gladly broke down the barriers of conventionality if this was likely to let in the fresh air, a sensitive, forward-looking designer with great practical knowledge and one of the gayest and most stimulating companions in any human gathering. He had great physical strength and courage (he served in the Parachute Regiment during the last war), ran a successful cricket team in his office, and made friends wherever he went."

Mr. W. A. Whitson has been appointed Commissioner for an enquiry into the state of industrial relations in the East African Railways and Harbours.

Mr. A. Signorini has been appointed General Manager of Pirelli-General Cable Works Limited, in place of Mr. J. R. Harding who has left to take up another appointment.



Mr. J. K. Blue
Appointed Freight Commercial Officer, S.E.
Division, S. Region

Mr. J. K. Blue, Passenger Assistant, Waterloo, who, as recorded in our July 29 issue, has been appointed Freight Commercial Officer, Line Traffic Manager's Office, South Eastern Division, Southern Region, entered the service of the London, Brighton & South Coast Railway at Brighton in 1918, and after periods at various stations and depots was transferred to the Southern Railway Commercial Headquarters in 1934. From 1942 to 1945 he served with the Royal Air Force. After his return to the railway he was appointed successively Head of Commercial Superintendent's Excursion Section in 1950, Deputy Chief of Passenger Section, 1951; Chief Commercial Clerk, Redhill District, 1953; Chief Clerk, Redhill District, 1955; Traffic Development Officer, Orpington District, 1956 and Passenger Assistant to Line Traffic Manager, South Eastern Division, 1958. Mr. Blue became Passenger Assistant to the Commercial Officer, Waterloo, in 1959.

B.I.C.E.R.A. ELECTIONS

With reference to our July 29 issue:—For Sir Harold Rosbee Cox, read Sir Harold Roxbee Cox; Mr. M. I. Mar was printed in error. Additions to the list of New Members of Council are Mr. H. N. G. Allen and Mr. C. G. Tangye.

We regret to record the death of Mr. H. W. Newman, late Bridge Assistant of the former L.M.S. Railway.

We regret to record the death, at the age of 83, of Dr. P. Lewis-Dale, former Chief Chemist, London Midland & Scottish Railway. Dr. Lewis-Dale joined the former L.N.W.R. Chemical Laboratory, Crewe, as an assistant chemist in January 1910. He became Assistant Chief Chemist, L.N.W.R., in 1920, and was appointed Chief Chemist in October of the same year. In 1924 he was awarded the degree of Doctor of Philosophy by the University of London for his work on "Liquid Hydrocarbons obtained from the compression of oil gas." After grouping in 1923 he remained at Crewe as Chief Chemist of the L.N.W. Section of the L.M.S.R., and in January 1933, on the formation of the Research Department, he was appointed Chief Chemist, L.M.S.R., London. Dr. Lewis-Dale retired from that position in December, 1937.

NEW EQUIPMENT AND PROCESSES



Chipping and Scaling Hammer

THE CP-455-L chipping and scaling hammer is a lightweight, weld-flux chipping tool, suitable for chipping stone, metal, concrete, and for carving wood. Chippings are cleared from the workpiece by a jet of high-velocity air which may be directed downward to clear the chisel point.

The chipper uses a piston of 15/16-in. bore and 1-in. stroke, giving 4,200 blows per min. at a pressure of 90 lb. per sq. in. A new pulley valve gives smooth throttling action and permits accurate control of hammer speed and power. The valve has a larger diameter and shorter length than a spool valve, and can operate without loss of power when its clearance increases after wear.

An angle-scaling chisel is supplied with the chipper, and a narrow blade chisel is available. The chisels are held in the hammer by a positive retaining device and cannot rotate. Changeover is effected by a simple quick-release retaining clip. The net weight of the tool is 4½ lb. and overall length is 10½ in. The size of the air inlet thread is ½ in.

Further details can be obtained from the manufacturer, the Consolidated Pneumatic Tool Co. Ltd., 232, Dawes Road, London.

Mains Failure Generating Set

MAINS failure generating sets, designed to operate in all climates, operate automatically on mains failure to give a full load within 10 sec. of starting at temperatures down to -15 deg. C.

Each generator is powered by a 6-cylinder turbocharged diesel engine having a maximum output of 218 b.h.p. at 1500 r.p.m. and capable of giving 150 kW. under standard reference conditions. The engine unit is flexibly coupled to a two-bearing alternator, producing 135 kW., 0.8 power factor, 168.75 kVA., 415/240 V. 3-phase 50 cycles, having $\pm 2\frac{1}{2}$ per cent voltage regulation.

The 4-stroke, direct-injection engine is water-cooled. Features include a single-piece crankcase carried below the crankshaft centreline for maximum rigidity; removable wet-type cylinder liners and "H" section alloy steel connecting rods designed to allow withdrawal through the cylinder bores.

Further details can be obtained from the manufacturer, Henry Meadows Limited, Fallings Park, Wolverhampton.

Heat Exchanger

CRANE heat dissipaters, developed to form an integral part of the cooling system for mechanical shaft seals, are now available for use as heat exchangers for many

other purposes provided that the working temperature does not exceed 180° F.

The single standardised design has a capacity of 10,000 B.T.U. per hr. Multiple units can be used if the rate of flow and the required temperature drop are excessive for one; the arrangement can be in series or parallel. Proof against attack by corrosive liquids or gases is ensured by the use of stainless steel for all components except the coolant connections which are of mild steel, cadmium plated.

The liquid to be cooled is circulated through a coil of seamless tube, pressure-tested to 3,000 lb. per sq. in., silver soldered into the end plate. It does not come in contact with the solder. The shell is a 3½-in. dia. seamless tube, pressure-tested to 200 lb. per sq. in.; into this are fitted the endplate and the cap at the opposite end both of which have O-ring seals. The coolant (normally water) circulates round the element within the shell.

The heat dissipater should be installed with the pipe connections upwards to avoid airlocks. Other positions can be used if trapped air is eliminated before the unit is put to work. Dismantling is straightforward for the removal of coatings or deposits inside the shell which should be cleaned with a water jet or compressed air; a wire brush should be used to remove hard scale.

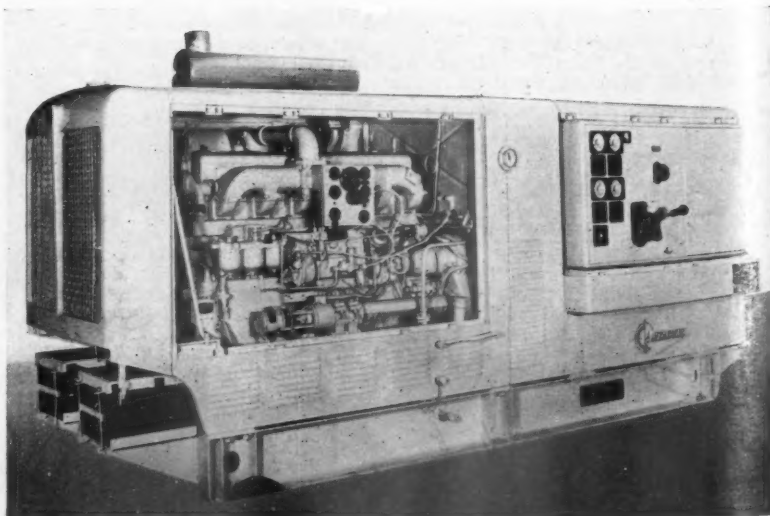
Further details may be obtained from the manufacturer, Crane Packing Limited, Slough.



Anti-Glare Train Window

A LAMINATE train window incorporating shaded and heat-absorbing plate glass is claimed to eliminate sun- and sky-glare and to filter out undue heat. Plastic in the laminated glass is graduated in colour from dark to clear. The shaded band extends 16 in. from the top of the window to provide extra protection against bright sky glare. Claimed to lower air-conditioning operating costs, this window has been installed in trains on the Chicago & North Western Railway.

Further information can be obtained from the manufacturer, the Libbey - Owens - Ford Glass Company, Ford Building, Toledo 1, Ohio, U.S.A.



Ministry of Transport Accident Report

*Deraiment between Holmes Chapel and Sandbach,
February 8, 1960: British Railways, London Midland Region*

COLONEL W. P. Reed, Inspecting Officer of Railways, Ministry of Transport, inquired into the derailment which occurred at 1.18 a.m. on February 8, 1960, between Holmes Chapel and Sandbach on the up main line between Manchester and Crewe. The 9.52 p.m. York to Swansea steam-hauled express ran at 45-50 m.p.h. on to an uneven section of line where there was a 10 m.p.h. speed restriction because of engineering work. In consequence of the derailment the train became divided into three parts. All the derailed vehicles remained in line as they came rapidly to a stand. There was little interior damage, though several of the coaches were leaning over the down line at an acute angle. Nobody was injured.

Both tracks were extensively damaged, but the overhead electrification equipment, installed a few months previously, was not affected. All the coaches were re-railed by 7.50 p.m., and at 7.11 a.m. next morning single-line working was introduced on the up line. The down line was opened for traffic at 1.8 p.m. The night was cold but clear and there was a moon.

The train consisted of 13 coaches weighing 401 tons, drawn by a 4-6-0 tender engine weighing 126 tons. The brake-efficiency of the engine was 64 per cent. and that of the coaches 81 per cent. Screw couplings were in use throughout the train.

Deraiment of Engine Wheels

The trailing wheels of the engine bogie first became derailed, and damaged and loosened the rail fastenings. The engine, with these wheels derailed, and the first four coaches, which were not derailed, stopped 643 yd. ahead of the point of initial derailment.

There was a gap of 300 yd. between this portion and the next three coaches, which, except for the front bogie of the leading one, were derailed towards the down line.

Between these and the last six coaches, which were all derailed, there was a gap of 22 yd. The first four of the last six coaches were embedded in the ballast in the six-foot way, and were leaning over the down line at angles ranging from 45 deg. for the leading coach to 25 deg. for the fourth. All were in line longitudinally and there had been no telescoping. The end of the train had come to rest about 30 yd. past the point of initial derailment.

The engine was virtually undamaged. Apart from their bogies, the coaches also suffered very light damage, but the fractured drawbar hook at the rear end of the fourth coach gave evidence of very severe stress. Tests of the vacuum system and the brake gear on the engine and undamaged stock showed that all the equipment was in good working order.

At the site of the accident the line is straight and level. The general speed limit is 75 m.p.h. The track in the up line consisted of 95-lb. bull-head rails on wood sleepers at the point of derailment and for 240 yd. past it. Thereafter it consisted of 109-lb. flat-bottom rails on wood sleepers.

Work on Permanent Way

Both up and down tracks had been lifted and replaced the previous day in connection with preliminary work relating to the construction of a new bridge to carry the railway over the proposed Preston to Birmingham motorway. This work consisted of the placing of concrete rafts some 5-6 ft. below

rail level, and the formation level over them had been restored by sleeper cribbing and sleeper decking to support the ballast. Two narrow trenches, driven across the track for ancillary sheet piling and cut through the ballast and formation down to raft level, had been simply filled in, with a good depth of ballast on top.

The point of original derailment, indicated by a diagonal score mark 9 ft. long on the six-foot rail (i.e. on the side towards the down track) began over one of the filled-in trenches at about 37 ft. beyond a low rail joint situated over the second sleeper crib from the down end of the work. This joint was found after the accident to be about 1½ in. low, though the cross-level was correct; 15 ft. beyond the joint the six-foot rail was ¾-inch high, and near the beginning of the score mark, at about 30 ft. past the joint, the cess rail was ¾-in. high.

Track Damaged

Beyond the score mark the outside jaws of the rail chairs were broken and there were other characteristic signs of track damage by derailed wheels. The next rail length ahead remained more or less in place, though distorted; but the six foot rail beyond it had been dislodged and was found 65 ft. ahead under the last coach but one.

It was clear that the trailing bogie wheels of the engine were the first to become derailed towards the down line. The flange of the wheel on that side broke the outside chair jaws, and the passage of the engine and first five coaches must have loosened and displaced the rail on that side of the track sufficiently for the remaining coaches to become fully derailed.

The train remained coupled while it travelled for about 300 yd. beyond the point of derailment, but with an increasing number of coaches becoming derailed as they reached the displaced track. In the end the drag of the derailed coaches caused the train to split into three parts as already described.

After the division the rear six derailed coaches must have stopped very quickly as they ploughed through the ballast. The three coaches in front travelled a further 22 yd., and the engine and first four coaches ran another 300 yd. on the flat bottom track which was not displaced in any way by the derailed engine bogie wheels, before coming to a stand.

Speed Restriction

When the work on the bridge was started, a 10 m.p.h. speed restriction was imposed. This was still in force at the time of the accident. It had been published in the usual way in the printed weekly notices issued to train crews.

The standard warning signs had been erected on the track: a "C" board close to the restricted area on the approach side and a warning board about 1,250 yd. in rear. Both boards were illuminated at night. The lights showed up well at night, and there were no adjacent lights to detract from their effectiveness.

Arrangements for the safety of the line after the ballast and track had been replaced above the excavations and had been made good included the allocation of two lengthmen to be on duty at the site during the night to watch the behaviour of the replaced track under passing trains and to carry out such packing as might be necessary.

On the previous day the line had been blocked for the bridge preparation work.

After its re-opening four trains had passed on the up line before the one which was derailed.

The lengthman on duty that night said that all these trains had travelled at the proper speed without undue motion over the re-laid lengths. He had not found it necessary to do any packing on either of the lines, which had been in good order for a speed of 10 m.p.h. When the train involved in the accident was approaching, one lengthman said that he was called out of the temporary cabin by his mate. He thought the train was travelling at 40-50 m.p.h. His recollection was that the engine was not steaming but that there was no sound of brakes.

He said that there were a lot of sparks and banging noises after the derailment occurred. He went at once to the site telephone and told the Sandbach signalman to block both roads.

The other lengthman corroborated this evidence, saying that he thought that the train was travelling about three times as fast as it should have been. He too heard no sound of brakes.

Drivers' Evidence

The driver of the previous train to travel over the site of the derailment said he thought the track was a trifle rough, "just as was to be expected on a 10 m.p.h. speed restriction, with a sponginess in the rail".

On this occasion and also on a previous occasion he had shut off steam on passing Holmes Chapel when he had been travelling at about 45 m.p.h., and had brought down his speed to 10 m.p.h. by a very moderate brake application.

The driver of the train involved in the accident said that he took over at Stockport, where he had tested the vacuum and was fully satisfied with it. He had received the weekly notice and was aware of the 10-m.p.h. speed restriction. He maintained that his speed through Holmes Chapel was only about 35 m.p.h., though there was no speedometer on the engine by which he could check it. The train was slowing down, he stated, as it ran past the warning board, which he saw. He also saw the "C" board and thought that the speed was down to about 10 m.p.h. when he felt a bump.

He had been seated, on the left-hand side, and had been looking forward through the spectacle glass, but he then leaned out and saw sparks under the front of his engine. He said that he was about to apply the brake when it came on fully.

Colonel Reed explained to the driver that his engine had come to a stand about 640 yd. ahead of the point of derailment and that it had run a considerable distance after the brake had become applied. He pointed out that this could not have happened from a speed of 10 m.p.h. The circumstances showed that the speed must have been of the order of 40-50 m.p.h. The driver insisted, however, that he had reduced speed to approximately 10 m.p.h. so far as he could judge. He added, when asked, that he always sat on the driver's seat when driving.

The fireman confirmed the driver's evidence except that he claimed to have seen the driver make a full brake application within seconds of the engine beginning to ride roughly.

He thought that the train had been running at a maximum speed of perhaps 50 m.p.h. between Stockport and Holmes Chapel but had slowed down to 30-35 m.p.h. before the driver began to apply the brake for the speed restriction. He added that it

was difficult to estimate the speed at the restriction which he thought to have been 10-15 m.p.h. because the engine was riding like a coach. Neither he nor the driver felt a snatch when the train became divided.

The guard of the train, who was travelling in the 11th coach, said that he knew about the speed restriction which he had seen in the weekly notice. He added that he felt a definite brake check after reaching Holmes Chapel and thought that the train had reached the warning board. He was about to lower the window glass and look out when his coach became derailed and he was thrown violently against the brake wheel. He maintained, however, that the speed was only 10 m.p.h. and suggested that the violence of his movement was caused by the sudden tilting of the coach.

Assessment of Speed

Colonel Reed states that if the driver's evidence that he did not apply the brake after the initial derailment of the engine is to be accepted, the brake must have been applied by the parting of the vacuum pipe when the train became divided. It is clear, therefore, that the engine and the first four coaches must have travelled at least 340 yd. with a full emergency brake application before they stopped.

The British Railways braking curves show that the speed of an engine and four coaches in good condition must have been about 45 m.p.h. when the brake became fully applied for them to have travelled this distance.

It is reasonable to assume that the speed was somewhat higher when the engine became derailed, in view of the drag of the derailed coaches while the train ran for 300 yd. before it became divided. On this basis the speed of the train must have been between say 45-50 m.p.h., and about 12 sec. must have elapsed between the derailment of the engine and the application of the brake by the parting of the train.

It will be appreciated, Colonel Reed adds, that these assumptions are the most favourable ones in regard to the speed. Any others based on the evidence, bearing in mind the braking characteristics of rolling stock, would give rise to a higher estimate of speed when the engine became derailed.

Some confirmation of this is provided by calculating the average speed of the train between Stockport and the point of derailment. It took 24 min. to travel 16½ miles. After allowing for the time taken in accelerating, this gives an average speed of 43 m.p.h. The estimate is further confirmed by the evidence of the permanent way men at the site.

Inspecting Officer's Conclusions

The imperfections in the track as measured on the following day may have been accentuated by the impact of the engine as it passed over the disturbed formation at excessive speed. Even if the track had been in that condition as the train passed by, it would not have caused a derailment if the speed had been properly controlled as required by the restriction.

There is bound to be uneven settlement for a time under the track when the formation has been disturbed, involving variations in level and alignment. That is why the severe speed restriction is imposed. Colonel Reed does not consider that the engineering staff were to blame for the derailment.

He is satisfied that the train became derailed because it passed on to the speed-restricted portion of the line at an excessive speed, which he estimates to have been between 45 and 50 m.p.h., and that the driver was responsible for the accident by his failure to control the train. Colonel Reed cannot

accept his evidence about the running of the train since it is contrary to the facts. He also concludes that the fireman's evidence regarding the speed of the train was biased, probably out of mistaken loyalty to his driver. The guard cannot have been alert. His evidence indicates that when he, in the eleventh coach, thought of looking out of the window for the speed restriction boards, the greater part of the train had already become derailed.

The driver said he was aware of the speed restriction, and Colonel Reed sees no reason to doubt his statement. The night was clear; the restriction boards were well lit; and there was no extraneous lighting in the area to distract attention from them.

Colonel Reed believes that his speed was

so greatly in excess of the required restriction that no plea of misjudgment is acceptable. In view of the driver's attitude, it was not possible to find out what he was really doing as the train approached the speed restriction, and it can only be assumed that for some undisclosed reason he was not alert.

Cause Unexplained

The circumstances of this accident bear a resemblance in some respects to those of unexplained ones where drivers have run past signals at danger, and, Colonel Reed concludes, they will be brought to the notice of the panel of medical and scientific officers who are examining this problem at the request of the British Transport Commission.

Western Region Diesel-Electric Pullman Trains

Paddington to Bath and Bristol and to Birmingham and Wolverhampton services to be introduced on September 12

The eight-car multiple-unit diesel-electric Pullman trains, including first and second class accommodation, described and illustrated in our June 24 issue, will begin service in the Western Region, British Railways, between Paddington and Bath and Bristol Temple Meads, and Paddington and Leamington and Birmingham Snow Hill and Wolverhampton Low Level on September 12 running on Mondays to Fridays. The timings given below are experimental and subject to review.

The eight-car sets, built by the Metropolitan-Cammell Carriage & Wagon Co. Ltd., accommodate 108 first and 120 second class passengers.

The maximum Pullman supplements will be 10s. first and 5s. second class between London and Bristol and London and Birmingham or Wolverhampton.

"Bristol Pullman"

The Paddington-Bristol services will be known as the "Bristol Pullman." The set will leave Bristol Temple Meads at 7.45 a.m., running non-stop via Badminton to Paddington, due 9.35 a.m. It returns from Paddington at 10.5 a.m., arriving Bath at 11.40 a.m., and Bristol 12 noon.

In the afternoon there is an up working

at 12.30 from Bristol and 12.45 from Bath, due Paddington 2.25 p.m. The last departure is from Paddington at 4.55 p.m., again non-stop via Badminton, with arrival in Bristol at 6.45 p.m.

"Birmingham Pullman"

Services between Paddington and the Midlands are to be provided by the "Birmingham Pullman." The morning run is from Wolverhampton Low Level at 7 a.m. and from Birmingham Snow Hill at 7.30, Solihull at 7.40, and Leamington Spa Central at 8 a.m., due Paddington at 9.35. The first down departure is from Paddington at 12.10 p.m., with arrivals in Leamington at 1.34 and Birmingham at 2.5 p.m.

The up afternoon train will leave Birmingham at 2.30 and Leamington 2.55, arriving Paddington at 4.25. On the evening trip departure is from Paddington at 4.50 p.m., due Leamington 6.19, Solihull 6.44, Birmingham 6.55, and Wolverhampton 7.20 p.m.

B.I.C.C. LTD. READING BRANCH ADDRESS.—British Insulated Callender's Cables Limited has announced that the address of its Reading Branch is Katesgrove Lane, Reading; tel. Reading 55074.



Air-conditioned second class saloon in Western Region diesel-electric Pullman train, showing arrangement of single and double seats

Staff and Labour Matters

British Transport Officers' Guild

It has been announced that, at a meeting of the Joint Negotiating Committee held on August 8, an effective increase of 10 per cent would be granted as from January 4, 1960, in the salaries of British Railways out-of-category staff in receipt of salaries between £1,045 and £2,260 a year inclusive at that date.

The interim award of 5 per cent granted as from January 11, 1960, has now been improved by a 10 per cent increase as from January 4, 1960.

Further negotiations are in progress in regard to a revised salary structure for out-of-category staff to provide for a much smaller number of salary ranges.

As a result of applications made to the Commission by the Guild, increases of 6d. on each meal allowance and 2s. on night expenses, making a total increase of 4s. in the full day and night scales, have been agreed to take effect from July 11, 1960, and an increase of 10s. a week in the lodging allowances with effect from January 4, 1960. These increases are applicable only to staff covered by the Joint Negotiating Agreement.

Applications are being made for the extension of the above award, and for increased personal expenses and lodging allowances to staff represented by the Guild in other Divisions of the Commission.

British Railways Signalling Schemes for Tyneside

The North Eastern Region of British Railways is taking another step forward in the modernisation of its signalling system in the Tyneside area with the construction at Gateshead of a new power signalling installation, incorporating colour-light signals and route relay interlocking. Work has already started on this scheme. Another scheme shortly to be undertaken is the extension of the area at present controlled from the new signalbox at Newcastle Central.

The Gateshead scheme comprises a complete new colour-light signalling system in the Gateshead area south of the Tyne. A new signalbox, situated at Gateshead, will replace the signalboxes at Bensham Curve, King Edward Bridge, Greensfield, High Street, and Park Lane which are in any case due for renewal. This new signalbox will house a route relay interlocking console of some 234 routes and will take over all the work previously done by the five redundant signalboxes, controlling an area of 11½ track miles.

Extension of Newcastle Control Area

When the present signalbox at Newcastle was planned and constructed, provision was made for future extension of the area of its control to be introduced in stages. Site work on the first will begin in January next. With the present apparatus, which replaced four older signalboxes, 641 separate routes can be signalled. The new scheme will add 110 more routes and displace a further six signalboxes; Manors North, Argyle Street, Osborne, Riverside Junction, Jesmond Station and West Jesmond. Colour-light signals will be installed and the existing system of pneumatic point operation will be extended.

When the work is completed, the signalmen at Newcastle Signalbox will have a visual indication on an illuminated track diagram of all trains approaching from ½ mile distant on the lines from Gateshead, Low Fell and Carlisle, 2½ miles distant on the

main line from Heaton, 3 miles distant on the Blyth and Tyne lines from South Gosforth, and 2½ miles distant on the Riverside branch from St. Peters. Altogether the box will control a total of 17 track miles. The extension of the area of control now exercised by Newcastle Central Signalbox will not only achieve economy but will permit of better regulation of trains and speedier and more efficient operation in this busy locality. Further extensions of control on

the West lines towards Carlisle are at present in the planning stage and will bring similar advantages.

These schemes, coupled with others already under way or planned, will give colour-light signalling throughout the area in and around Newcastle, part of which will form an important link in the provision of a continuous 83 mile stretch of colour-light signalling on the East Coast main line from Kimblesworth to Burnmouth.

Contracts and Tenders

Diesel trains for the Tunisian National Railways

The Nuremberg Works of Maschinenfabrik Augsburg-Nürnberg has been awarded a contract for the manufacture and supply of 12 diesel railcars and 25 control trailers for the Tunisian National Railways. Each power coach will be equipped with a 700-h.p. diesel engine. The engine and transmission will be installed in the coach body so as to limit the axle load to 15 tons. At the same time this arrangement will afford maximum protection of the engines against the dust developing on African routes. The vehicles can be coupled together to form two-car or three-car train units. In addition M.A.N. will build two state coaches for President Bourguiba.

British Railways, London Midland Region, has placed the following contracts:—

Structural Waterproofers Limited: repairs to roof at Road Motor Depot, St. Pancras

Evode Limited: waterproofing roofs at Sheet and Sack Stores, Trent

Terresearch Limited: soil investigation in preparation for reconstruction of Birmingham New Street Station

George Dew & Co. Ltd.: construction of bridge to carry line over Birmingham-Preston Motorway at Knutsford, for Ministry of Transport

Arundel (Contractors) Limited: cleaning and painting of Manchester Central Passenger Station

Constable Hart & Co. Ltd.: resurfacing of roadways at Blackpool Central Passenger Station and Preston Butler Street Goods Yard

J. Rata & Co. Ltd.: renewal of roof coverings at Croxley Green Carriage Shed.

The Export Services Branch, Board of Trade, has received calls for tenders as follow:—

From South Africa:

2 electric motor-driven heavy duty railway carriage and wagon wheel lathes of the roll-in type as called for in the mechanical and electrical specification, complete with motors and starters

2 sets of electric lighting equipment as called for in the electrical specification

1 set of velograph or litho prints as called for in the mechanical specification.

The issuing authority is the Stores Department, South African Railways. Bids in sealed envelopes, endorsed "Tender No. G. 8364: Wheel Lathes" should be addressed to The Chairman of the Tender Board, P.O. Box 7784, Johannesburg. The closing date is September 9, 1960. Local representation is essential. The Board of Trade reference is ESB/20731/60.

From Egypt:

500,000 kg. of copper ingots.

The issuing authority is the Egyptian Republic Railways. Bids should be sent to the Purchases & Stores Department, Railways Buildings, fifth floor over Shoubra Subway,

Shoubra, Cairo. The tender No. is E.R.306 G.8/537. The closing date is September 10, 1960. The Board of Trade reference is ESB/20532/60. No further information is available at the Board of Trade.

From Argentina:

A large quantity of bogies, mounted axles, axle and wheel rims and centres, for 5-ft. 6-in and 4-ft. 8½-in. gauges.

The issuing authority and address to which bids should be sent is the Argentine State Railways Administration, Av. Corrientes 389, Buenos Aires. The tender No. is 30/60. The closing date is September 27, 1960. The Board of Trade reference is ESB/21046/60. No further information is available at the Board of Trade.

10 diesel-electric locomotives and spares, 4-ft. 8½-in. gauge.

The issuing authority and address to which bids should be sent is the Argentine State Railways Administration, Av. Corrientes 389, Buenos Aires. The tender No. is 29/60. The closing date is September 22, 1960. The Board of Trade reference is ESB/21045/60. No further information is available at the Board of Trade.

From Chile:

29 1,200-h.p. diesel-electric or diesel-hydraulic locomotives, metre gauge

9 600-h.p. diesel-electric or diesel-hydraulic locomotives, metre gauge

12 400-h.p. diesel-electric or diesel-hydraulic locomotives, metre gauge

10 1,600/2,000-h.p. diesel-electric or diesel-hydraulic locomotives, 5-ft. 6-in. gauge

49 600-h.p. diesel-electric or diesel-hydraulic locomotives, 5-ft. 6-in. gauge

4 400-h.p. diesel-electric or diesel-hydraulic locomotives, 5-ft. 6-in. gauge.

The issuing authority is the Chilean State Railways. Bids should be sent to Jefe del Departamento de Tracción y Maestranzas, Ferrocarriles del Estado de Chile, Al. B. O'Higgins 934, 3° Piso, Santiago. The closing date is October 28, 1960. Photo copies of tender documents are not available at the Board of Trade, but the documents may be inspected in room 620 at Lacon House.

Further details relating to the above tenders together with photo-copies of tender documents, unless otherwise stated, can be obtained from the Branch (Lacon House, Theobald's Road, W.C.1).

The Toronto Transit Commission has called for tenders for the supply and installation of block signal and interlocking equipment for some 12,000 ft. of subway. The closing date is October 17, 1960. All tenders must be on the Commission's form of tender and must be accompanied by cash or a certified cheque in the amount noted in the tender and contract requirements. For further details see the official notice on page 232.

Notes and News

Flexible Drives (Gilmans) Limited, Change of Address.—The new address of Flexible Drives (Gilmans) Limited is Skataskalo Works, Millers Road, Warwick; tel. Warwick 448-9.

Accident on Italian Cableway.—Four people were killed and six injured on August 15, when a passenger cabin on the Monte Fauto cableway, near Naples, fell 60 ft. on to the track of the Vesuvius railway. One of the main cables slipped off its pulley when the cabin approached the lower terminal. The car hit the terminal building, killing the conductor and three passengers. The impact was so violent that the cable snapped and the cabin fell a further 60 ft. The conductor of the other car was able to apply the emergency brake, preventing a further accident.

Royal Visit to Cardiff.—On August 5, the Queen travelled to Cardiff to attend the National Eisteddfod. She was received at Cardiff General Station, British Railways, Western Region, by the Duke of Edinburgh; Colonel C. G. Traherne, Lord Lieutenant of Glamorgan; and Ald. Mrs. Dorothy Lewis, Lord Mayor of Cardiff. On the following

day Prince Charles and Princess Anne, and Princess Alexandra and Prince Michael of Kent arrived at Cardiff General to join the royal party. This was a private visit, and there was no official reception.

Railway Shipping Services Affected by Seamen's Strike.—Certain steamer services of British Railways, Southern Region, to the Continent and Channel Islands and of the London Midland Region to Northern Ireland and several ocean liner sailings, were cancelled or delayed last week and earlier this week because of the unofficial strike of seamen, and men at some ports were refusing to report for, or to perform duties, as we went to press. At Liverpool, on August 16, dockers and the crews of river vessels struck in support of the seamen.

First Electric Trains to Amersham and Chesham.—Electric trains ran for the first time on August 15 between Rickmansworth and Amersham and Chesham on the newly electrified sections of the London Transport Metropolitan Line. No passengers are being carried on these trains at present. The current was switched on on August 14 and, until September 12 when electric passenger services are due to start, several trips with empty electric trains will be run each day outside the peak hours to enable train crews to learn the road. Most of the training trips will be worked from Rickmansworth to Amersham or Chesham by an empty train of Metropolitan Line multiple-unit compartment stock, but at weekends some of the trips to Chesham will be by a train of Aylesbury stock hauled by a Metropolitan electric locomotive, which will run round the train at Chesham.

Conversion Scheme for British Waterways Barges.—The South Eastern Division of British Waterways is replacing water-cooled by Petter air-cooled engines in its entire carrying fleet of 90 pairs of commercial boats. In 1959 orders were placed for 31 "PD2M" type twin-cylinder vertical air-cooled marine diesel propulsion units manufactured by Petters Limited, a member of the Hawker Siddeley Group. The engines develop 20 b.h.p. at 1,500 rev./min. They are fitted with 3:1 reduction gear and a special lever for remote control. A bilge pump with clutch for remote mounting with drive belt, a large-capacity lubricating oil pump,

and 12-V. electric starting equipment and overhead hand starting are notable features. The engines were built to a special specification to allow them to be used with the existing stern gear. During 1960 British Waterways placed an additional order for 30 "PD2M" units, the second stage of the conversion scheme which will take three years to complete.

Offer to Take Over N.E. Region Branch.—Mr. Watson Sayer, of Kirkby Stephen, is reported to have offered to take over the 48-mile line of British Railways, North Eastern Region, from Barnard Castle. The section is losing money, and it is proposed to close it later this year. Mr. Sayer is to meet railway representatives to discuss buying, leasing or managing the line. He wishes to cut staff, use two or three diesel locomotives instead of the 10 steam locomotives now used, and provide free buses from stations into town centres to attract passengers.

The Institute of Transport: Week-end Course at Oxford.—The Council of the Institute of Transport announces a week-end course for members of the Institute at New College, Oxford, from Friday, September 16 (dinner), to Monday September 19 (breakfast). Major-General G. N. Russell, Immediate Past President, will preside, and the course will consist of lectures and discussions on "The Inter-relationship of Inland and International Transport." The course is open to members of all grades, and participants will be accommodated in the College. There is no accommodation for ladies. The charge for the Course will be £5 15s. 6d.

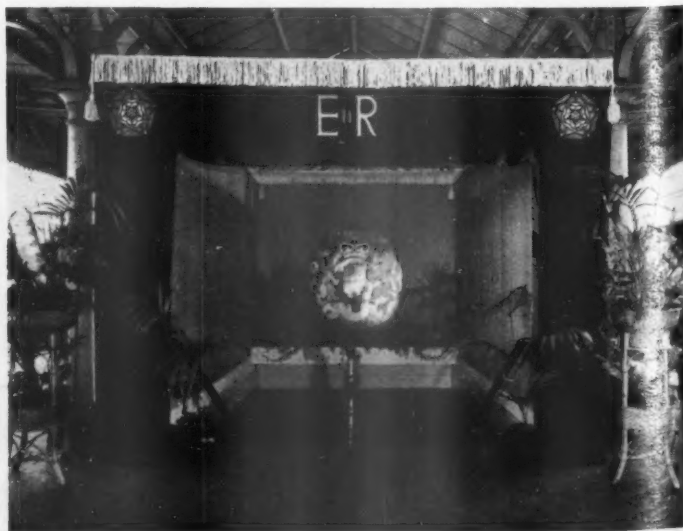
D.S.I.R. Report on Research Associations.—A report of the Department of Scientific & Industrial Research shows that the total income of grant-aided research associations from industry and Government rose from £5,100,000 in 1955 to £7,300,000 in 1959, of which the D.S.I.R. contributed £1,700,000. Basic, applied, and sponsored research and development, information and advice benefit, though each research association is designing its own pattern of advance to meet the needs of its industry. Reference is made to research on the creep and fatigue of metals, in which the D.S.I.R. is co-operating with one or more research associations. The report includes an article by Dr. J. Thomson, Director of the British Scientific



The Queen arriving at Cardiff General Station



Prince Charles and Princess Anne, and Princess Alexandra and Prince Michael of Kent arriving at Cardiff General Station, left, and station decorations, right



Instrument Research Association, on the progress of research on instrumentation and automatic control in industry, also descriptions of the work of each research association. It is entitled "Research for Industry, 1959," and is obtainable from H.M. Stationery Office, price 8s. or 8s. 7d. by post.

Oil Plant Extension Plan.—Shell-Mex & B.P. Limited has announced a £250,000 extension to its Leeds oil installation. Work is expected to start in September and will take two years. It will be on a site next to the British Waterways warehouses at the port of Leeds and near the existing installation and will consist of 12 large storage tanks and ancillary equipment.

Ruston Shunting Locomotives for Portugal.—The first of eight LSSH 275-h.p. shunting locomotives ordered from Ruston & Hornsby Limited of Lincoln by Siderurgia Nacional S.A.R.L., for a steelworks at Seizal, Portugal, was despatched recently. A description of the locomotive was given in last week's issue. The accompanying illustration shows the unit in transit to the docks by road through Lincoln.

Massey - Ferguson Limited Communication System — Massey - Ferguson Limited, Toronto, has put into operation a 9,000 mile, automatic, internal communications system which links its 44 offices in 36 cities across Canada and the United States with a private line teletypewriter network. The control centre for the system, capable of handling 100,000 words daily at the rate of 75 words per min., is located in the company's Detroit offices.

The British Transport Commission at Boys' & Girls' Exhibition.—Visitors to the Boys' & Girls' Exhibition at Olympia, London, which opened last Tuesday and continues until August 27, are being invited to test their powers of observation in a series of quiz competitions arranged by the British Transport Commission. Members of the audience selected by ballot will be questioned about the films shown in a free cinema at the B.T.C. stand and prizes will be awarded. Other features of the B.T.C. stand will be a combined working model of railways, docks, waterways, and road transport and a special enquiry counter at which boys and girls can obtain particulars and advice about careers in British Transport.

University Extension Course on L.N.W.R. History.—The University of Birmingham Department of Extra-Mural Studies has arranged a course of 20 meetings to study the history of the London & North Western Railway. The tutor will be Mr. C. R. Clinker. Meetings will be held at 7.30 p.m. at Barr's Hill Grammar School, Coventry, beginning on October 10. The purpose is to study the evolution of the three constituent companies and the L.N.W.R. itself from 1846 onwards. Time will not allow of consideration of lines in Wales. Students should bring a map showing the railways before grouping in 1923. The lectures will be illustrated with material from the tutor's collection. The fee is £1, and enrolment will be at the first meeting.

P.M.T. Co. Ltd. Garage Opened at Biddulph.—At the invitation of Mr. R. W. Birch, Chairman of the Potteries Motor Traction Co. Ltd., Councillor S. Reeves, Chairman of the Biddulph Urban District Council, declared open the company's new garage at Biddulph. Forty buses will be operated from the garage. On the outside west wall is a steel-frame structure with two 7,000-gal. diesel fuel storage tanks over the reinforced concrete roof. This houses a Dawson bus washer and



Ruston LSSH 275-h.p. diesel-hydraulic shunting locomotive for Portugal in transit to the docks through Lincoln

re-fuelling equipment. Vehicles are led into the washer by means of V guides formed in the floor. The washer is semi-automatic; a photo-electric ray governs both the water supply and the revolving nylon brushes. Fuelling of vehicles is by Brodie Kent flow meters, gravity-fed from the overhead tanks.

Swansea & Mumbles Railway Souvenirs.—There are still a limited number of souvenir brochures for sale at 3s. 6d. each (post paid), and tickets at 6d. each, issued to mark the abandonment of the Swansea & Mumbles Railway.

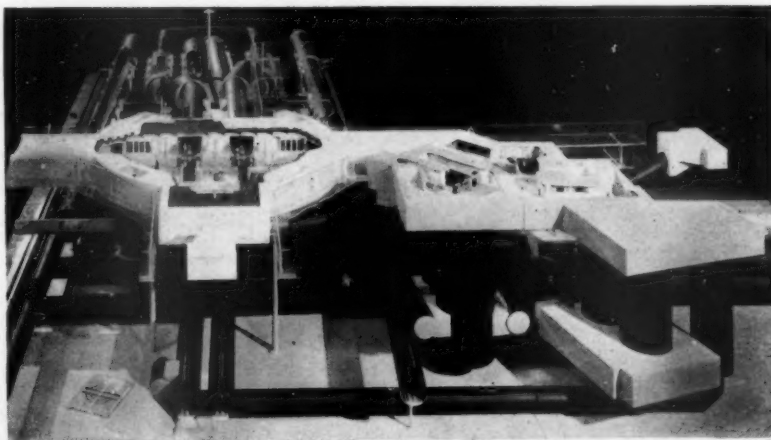
Trans-Zambesia Railway Co. Ltd. Results.—The net receipts of the Trans-Zambesia Railway Co. Ltd., including the Southern Approach to the Zambesia Bridge, for the year ended December 31, 1959, amounted to £283,679. The working expenses for the year, including the Southern Approach, and the amount provided for renewals, amounted to 74.4 per cent of the gross receipts as compared with 74.87 per cent in 1958. The total tonnage carried during the year was 789,194 tons, compared with 805,058 tons during the previous year.

Proposed New Station at Oxford Circus.—The model shown in the illustration is of the proposed new Oxford Circus Station, London Transport Executive, as it would be rebuilt if served by the proposed Victoria Line. The view, looking almost due north, shows the

Central Line tunnels running left and right and the new booking hall and escalators to the Bakerloo and Victoria Lines on the left. The model is being exhibited at the Central London Railway jubilee exhibition at Charing Cross Underground Station.

British Columbia Oil Pipeline.—Mr. Lyle Wicks, British Columbia Transport Minister, stated recently that a decision on which company will be authorised to build an oil pipeline and gathering system to serve the crude oil fields of north-eastern British Columbia may be expected soon. The Peace River Oil Pipeline Company (British Columbia), which had been granted the permit, considered that the provisions attached by the Provincial Government made it impossible to finance the line, and consequently refused the contract. Gibson Associated Oils, Trans-Prairie Pipelines, and Pacific Petroleum have also applied.

International Nickel Company of Canada Limited.—The interim report of the International Nickel Company of Canada Limited and subsidiaries for the six months ended June 30, 1960, shows net earnings in terms of U.S.A. currency of \$43,902,000 after all charges and taxes, equivalent to \$1.50 per common share. For the first half of 1959 net earnings were \$38,391,000, or \$1.31 per common share. The Chairman, Mr. H. S. Wingate, points out that the firm has been active in exploiting the properties of nickel



Proposed station at Oxford Circus, L.T.E., as re-built to serve the Victoria Line

in the field of high-strength, heat-resistant alloys, and that nickel will play a vital part in the high-speed vehicles of the future.

Dowty Group Acquisition.—The Dowty Group has acquired Designex (Coventry) Limited, which specialises in the design and manufacture of multi-spindle tooling and special-purpose equipment.

Netherlands Railways Company Increased Profit.—Netherlands Railways Company profit in 1959 amounted to Fls. 9,900,000 compared with Fls. 200,000 in 1958, an increase of Fls. 9,700,000. Income from passenger services decreased by Fls. 2,400,000, but freight transport yielded Fls. 5,200,000 more. Operating costs decreased by Fls. 5,000,000 to Fls. 488,000,000.

Keith Blackman Limited Results.—The Chairman & Managing Director of Keith Blackman Limited, Mr. D. S. Woodley, states that the year ended March 31, 1960, the value of orders received exceeded that of the previous 12 members, and the improvement is being maintained. Against this, account must be taken of considerably increased labour costs arising from the reduction of the working week in the industry, and advances in the costs of materials. Despite somewhat lower earnings, it is recommended that the dividend be held at 17½ per cent, less tax.

Harrison & Jones Limited New Plant.—Harrison & Jones Limited, of Purax Mills, Liverpool, 5, who process almost the whole range of upholstery fillings including curled hair, fibres, kapok, feathers, cotton and woollen felt, have purchased Swan Mill, Middleton Junction, near Manchester. In December last this mill was still producing yarn, but within six months the whole mill has been re-equipped to produce polyester and polyether-flexible foams. The wide range of industries now using this material includes insulation, and railway carriage, motor vehicle and domestic upholstery.

S. Smith & Sons (England) Ltd. New Division.—S. Smith & Sons (England) Ltd. has formed a new division to integrate its business in industrial products. They were previously made or marketed by Smiths Industrial Instruments Limited, Kelvin & Hughes (Industrial) Limited, and David Harcourt. The assets and undertakings of these companies have been transferred to the parent company, S. Smith & Sons (England) Limited. The new division will trade under the style of Smith's Industrial Division and will be under the general management of Mr. W. M. Cann.

Forthcoming Meetings

August 20 (Sat.).—British Railways, Southern Region, Lecture & Debating Society. Visit to Ipswich diesel depot.

September 2 (Fri.).—The Railway Club, at the Royal Scottish Corporation, Fetter Lane, E.C.4, at 7 p.m. Members' meeting and paper by Mr. H. A. Vallance on "North of Inverness."

September 3 (Sat.).—British Railways, Southern Region, Lecture & Debating Society. Visit to Redbridge sleeper depot.

September 3 (Sat.).—Railway Correspondence & Travel Society, South of England Branch, at the Junction Hotel, Eastleigh, at 6.30 p.m. Members' colour slide display.

September 4 (Sun.).—The Railway Correspondence & Travel Society, Cumbrian rail tour.

September 10 (Sat.).—Permanent Way Institution, London Section. Visit to Temple Mills Marshalling Yard & Hump Control. Joint visit with the Exeter & West of England Section.

September 10 (Sat.).—Railway Correspondence & Travel Society, Kegworth-Kingston-Gotham-Nottingham, and Gypsum Mines tour.

September 11 (Sun.).—Railway Correspondence & Travel Society, "The East Midlander" No. 4—Nottingham to Eastleigh and Swindon tour.

OFFICIAL NOTICES

TECHNICAL ASSISTANT required by Pirelli-General Cable Works Ltd., Leigh Road, Eastleigh, to undertake general liaison work in their overhead lines department which is concerned with railway overhead electrification. Applicants preferably should be aged 30 years or over, educated to a higher national certificate standard in civil or structural engineering and have obtained some experience of general civil engineering site and some design office work. Railway experience would be an advantage. Apply, with brief details of age, education and past experience, to The Manager, Overhead Lines Department.

TORONTO TRANSIT COMMISSION

Tenders for
Signal Contract SGI Bloor-Danforth-University
Subway

SEALED tenders endorsed "Signal Contract SGI Bloor-Danforth-University Subway" and addressed to the Toronto Transit Commission, General Secretary's Office, will be received by the Commission at its office, 1900 Yonge Street, Toronto 7, Ontario, Canada, until four (4) p.m. Eastern Daylight Saving Time (three (3) p.m. Eastern Standard Time) on Monday, October 17th 1960.

The work for which tenders are invited consists of providing and installing block signal and interlocking equipment for approximately 12,000 feet of subway as specified in the contract documents and shown on the contract plans.

All tenders must be on the Commission's form of tender and must be accompanied by cash or a certified cheque in the amount noted in the Tender and Contract Requirements.

The successful tenderer will be required to furnish, execute and deliver to the Commission a performance bond satisfactory to the Commission in the amount and within the time set out in the contract documents.

The contract documents, including plans and specifications, will be available at the Commission's Subway Construction Branch, 1138 Bathurst Street, Toronto, on and after Tuesday, August 2nd, 1960. Copies of the contract documents may be obtained by depositing one hundred dollars (\$100.00) with the Commission for each set of documents. The amount of the deposit will be refunded on the return of the plans and specifications in good condition within thirty (30) calendar days after the opening of the tenders.

The Commission reserves the right to reject any or all tenders.

No tender may be withdrawn after the scheduled closing time for receipt of tenders for forty-five (45) calendar days.

H. E. PETTETT
General Secretary

TYNE IMPROVEMENT COMMISSION

Appointment of Assistant Electrical Engineer

APPLICATIONS are invited for the position of Assistant Electrical Engineer, under the Commissioners' Electrical Engineer, in their Dock and Harbour Undertaking. The minimum qualification is the Higher National Certificate in Electrical Engineering and Membership of the Institution of Electrical Engineers with at least Student or Graduate status.

Applicants should have had experience in the maintenance and operation of A.C. and D.C. operated plant, control gear, substations and distribution systems, etc. The commencing salary will be within the range £850 to £1,300 per annum according to age and experience.

The post is superannuable and the successful applicant will be required to pass a medical examination and become a member of the Tyne Commission Superannuation Fund.

Applications stating age, qualifications and experience and giving the names of referees who can testify to the candidate's character and professional ability, should be sent to the undersigned in envelopes endorsed "Assistant Electrical Engineer" not later than 6th September, 1960.

R. N. EGGLETON,
Secretary.

Bewick Street,
Newcastle upon Tyne, 1.
10th August, 1960.

Railway Stock Market

There has been an upswing in stock markets, encouraged by hopes of a reduction in bank rate and prospects of an end of the credit squeeze. Buyers found markets short of stock, and as a result share prices moved strongly ahead. The new Chancellor of the Exchequer, Mr. Selwyn Lloyd, has yet to disclose his views on current problems, and it could well be that the City, which only a few weeks ago was plunged in gloom, is now getting too optimistic. While a cut in bank rate seems likely—though it may not be more than from 6 per cent to 5½ per cent—an early end of the credit squeeze appears improbable. Another factor which has brought buyers back to markets is the renewed hopes that the Prime Minister's recent visit to Western Germany may open the way for an agreement to prevent a trade war with the common market countries.

Foreign rails, though still inactive, were not without some response to the better market conditions. Buyers were more in evidence for Antofagasta stocks, and the ordinary improved from 13 to 13½, while the preference rose from 30 to 32, though elsewhere, the 4 per cent perpetual debentures were marked down from 47½ to 45½. United of Havana second income stock held the slightly better price of 6½. Costa Rica kept their rise to 43½, Chilean Northern 5 per cent first debentures changed hands up to 57, but elsewhere, Mexican Central "A" bearer debentures came back from 59½ to 58½. Brazil Railway Bonds were 6½, Sao Paulo Railway 3s. units kept at 1s. 1½d. and Paraguay Central prior debentures were 17½.

Salvador Railway consolidated stock was quoted at 2, the income loan stock at 14 and the 5 per cent prior lien debentures at 42½. International of Central America common shares remained at \$20, but the preferred was marked back from \$105½ to \$99½.

The recent Wall Street rally helped Canadian Pacific, which at \$44½ compared with \$41½ a week ago: the preference stock rallied from 56 to 57½ and the 4 per cent debentures were fractionally better at 61½. White Pass shares rose from \$11½ to \$12½.

Nyasaland Railways shares were again 9s. with the 3½ per cent debentures 46½.

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In the locomotive building, engineering and kindred sections, buyers were more in evidence, a reflection of the general market trend. Westinghouse Brake featured, having risen on balance from 45s. 3d. a week ago to 47s. Wagon Repairs 5s. shares at 14s. 6d. held the good rise which followed the results, while Charles Roberts 5s. shares gained 6d. at 12s. and Beyer Peacock 5s. shares at 7s. 1½d. were virtually the same as a week ago. G. D. Peters were again quoted at 16s. 3d. though remaining so firmly held that the quotation did not appear to be tested. North British Locomotive firmed up from 8s. to 8s. 3d. and Gloucester Wagon 10s. shares gained 3d. at 12s. 3d., while Birmingham Wagon rallied from 38s. 4½d. to 39s.

Among machine tools, Asquith 5s. shares receded 9d. to 12s. 10½d., Alfred Herbert gained 1s. 3d. at 60s. 3d., Wolf Tools 5s. shares were 13s. 9d. and Craven Bros. 5s. shares 8s. Aided by the chairman's statement about the current trend of business, Ruston & Hornsby rallied further from 26s. 3d. to 28s. 3d. Dowty Group 10s. shares firmed up from 36s. to 36s. 6d. and Pressed Steel 5s. shares rose from 28s. 9d. to 30s. 3d. Stone-Platt advanced from 55s. 3d. to 57s. 3d.

in the field of high-strength, heat-resistant alloys, and that nickel will play a vital part in the high-speed vehicles of the future.

Dowty Group Acquisition.—The Dowty Group has acquired Designex (Coventry) Limited, which specialises in the design and manufacture of multi-spindle tooling and special-purpose equipment.

Netherlands Railways Company Increased Profit.—Netherlands Railways Company profit in 1959 amounted to Fls. 9,900,000 compared with Fls. 200,000 in 1958, an increase of Fls. 9,700,000. Income from passenger services decreased by Fls. 2,400,000, but freight transport yielded Fls. 5,200,000 more. Operating costs decreased by Fls. 5,000,000 to Fls. 488,000,000.

Keith Blackman Limited Results.—The Chairman & Managing Director of Keith Blackman Limited, Mr. D. S. Woodley, states that the year ended March 31, 1960, the value of orders received exceeded that of the previous 12 months, and the improvement is being maintained. Against this, account must be taken of considerably increased labour costs arising from the reduction of the working week in the industry, and advances in the costs of materials. Despite somewhat lower earnings, it is recommended that the dividend be held at 17x per cent, less tax.

Harrison & Jones Limited New Plant.—Harrison & Jones Limited, of Purax Mills, Liverpool, 5, who process almost the whole range of upholstery fillings including curled hair, fibres, kapok, feathers, cotton and woollen felt, have purchased Swan Mill, Middleton Junction, near Manchester. In December last this mill was still producing yarn, but within six months the whole mill has been re-equipped to produce polyester and polyether-flexible foams. The wide range of industries now using this material includes insulation, and railway carriage, motor vehicle and domestic upholstery.

S. Smith & Sons (England) Ltd. New Division.—S. Smith & Sons (England) Ltd. has formed a new division to integrate its business in industrial products. They were previously made or marketed by Smiths Industrial Instruments Limited, Kelvin & Hughes (Industrial) Limited, and David Harcourt. The assets and undertakings of these companies have been transferred to the parent company, S. Smith & Sons (England) Limited. The new division will trade under the style of Smith's Industrial Division and will be under the general management of Mr. W. M. Cann.

Forthcoming Meetings

August 20 (Sat.).—British Railways, Southern Region, Lecture & Debating Society. Visit to Ipswich diesel depot.

September 2 (Fri.).—The Railway Club, at the Royal Scottish Corporation, Fetter Lane, E.C.4, at 7 p.m. Members' meeting and paper by Mr. H. A. Vallance on "North of Inverness."

September 3 (Sat.).—British Railways, Southern Region, Lecture & Debating Society. Visit to Redbridge sleeper depot.

September 3 (Sat.).—Railway Correspondence & Travel Society, South of England Branch, at the Junction Hotel, Eastleigh, at 6.30 p.m. Members' colour slide display.

September 4 (Sun.).—The Railway Correspondence & Travel Society. Cumbrian rail tour.

September 10 (Sat.).—Permanent Way Institution, London Section. Visit to Temple Mills Marshalling Yard & Hump Control. Joint visit with the Exeter & West of England Section.

September 10 (Sat.).—Railway Correspondence & Travel Society, Kegworth-Kingston-Gotham-Nottingham, and Gypsum Mines tour.

September 11 (Sun.).—Railway Correspondence & Travel Society, "The East Midlander" No. 4—Nottingham to Eastleigh and Swindon tour.

OFFICIAL NOTICES

TECHNICAL ASSISTANT required by Pirelli-General Cable Works Ltd., Leigh Road, Eastleigh, to undertake general liaison work in their overhead lines department which is concerned with railway overhead electrification. Applicants preferably should be aged 30 years or over, educated to a higher national certificate standard in civil or structural engineering and have obtained some experience of general civil engineering site and some design office work. Railway experience would be an advantage. Apply, with brief details of age, education and past experience, to The Manager, Overhead Lines Department.

TORONTO TRANSIT COMMISSION

Tenders for
Signal Contract SGI Bloor-Danforth-University
Subway

SEALED tenders endorsed "Signal Contract SGI Bloor-Danforth-University Subway" and addressed to the Toronto Transit Commission, General Secretary's Office, will be received by the Commission at its office, 1900 Yonge Street, Toronto 7, Ontario, Canada, until four (4) p.m. Eastern Daylight Saving Time (three (3) p.m. Eastern Standard Time) on Monday, October 17th 1960.

The work for which tenders are invited consists of providing and installing block signal and interlocking equipment for approximately 12,000 feet of subway as specified in the contract documents and shown on the contract plans.

All tenders must be on the Commission's form of tender and must be accompanied by cash or a certified cheque in the amount noted in the Tender and Contract Requirements.

The successful tenderer will be required to furnish, execute and deliver to the Commission a performance bond satisfactory to the Commission in the amount and within the time set out in the contract documents.

The contract documents, including plans and specifications, will be available at the Commission's Subway Construction Branch, 1138 Bathurst Street, Toronto, on and after Tuesday, August 2nd, 1960. Copies of the contract documents may be obtained by depositing one hundred dollars (\$100.00) with the Commission for each set of documents. The amount of the deposit will be refunded on the return of the plans and specifications in good condition within thirty (30) calendar days after the opening of the tenders.

The Commission reserves the right to reject any or all tenders.

No tender may be withdrawn after the scheduled closing time for receipt of tenders for forty-five (45) calendar days.

H. E. PETTETT
General Secretary

TYNE IMPROVEMENT COMMISSION

Appointment of Assistant Electrical Engineer

APPLICATIONS are invited for the position of Assistant Electrical Engineer, under the Commissioners' Electrical Engineer, in their Dock and Harbour Undertaking. The minimum qualification is the Higher National Certificate in Electrical Engineering and Membership of the Institution of Electrical Engineers with at least Student or Graduate status.

Applicants should have had experience in the maintenance and operation of A.C. and D.C. operated plant, control gear, substations and distribution systems, etc. The commencing salary will be within the range £850 to £1,300 per annum according to age and experience.

The post is superannuable and the successful applicant will be required to pass a medical examination and become a member of the Tyne Commission Superannuation Fund.

Applications stating age, qualifications and experience and giving the names of referees who can testify to the candidate's character and professional ability, should be sent to the undersigned in envelopes endorsed "Assistant Electrical Engineer" not later than 6th September, 1960.

R. N. EGGLETON,
Secretary.

Bewick Street,
Newcastle upon Tyne, 1.
10th August, 1960.

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